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parison of Prices—p. 172

The

IRON AGE

Illinois U Library

FEBRUARY 17, 1949

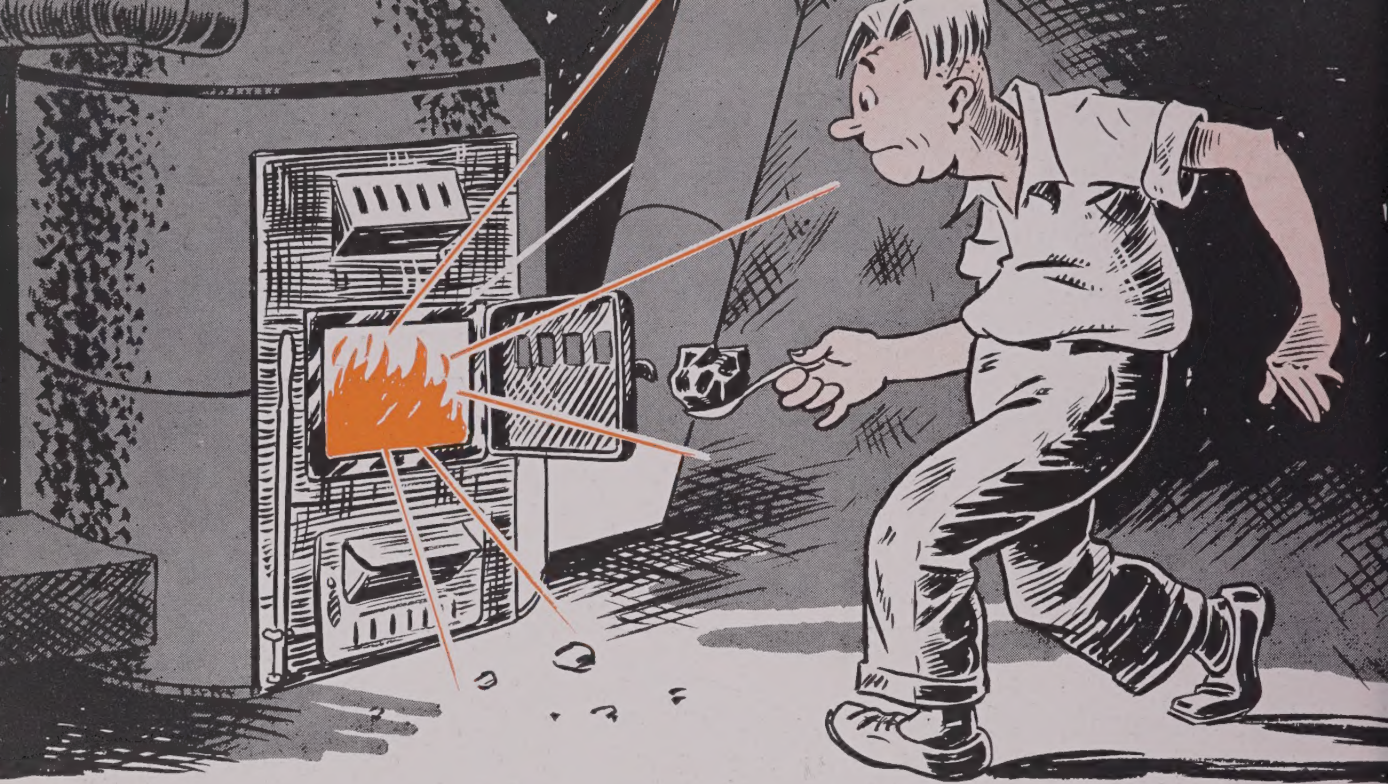
Inherent Quality

The close cooperation of management and men at Pittsburgh Steel makes possible the inherent quality in our products that serve you so well.



Pittsburgh Steel Company

Pittsburgh 30, Pa.



It's like feeding the furnace with a teaspoon

... **W**HEN you handle materials with a slow, undersize crane. Your crane equipment must be properly adapted to its job if you are to get efficiency and economy.

Too light a crane means expensive maintenance and short life . . . oversize motors and overweight construction mean

excessive depreciation and power costs.

Let experienced Whiting crane engineers adapt your materials-handling equipment to your current needs. They are experts in analyzing — then designing and building (or adapting) cranes to meet individual plant requirements. Ask for their recommendations.

IMPORTANT

Whiting has acquired the patents, manufacturing, and sales rights to Spencer & Morris Trambeam Systems. These, combined with Whiting Hoists, Light Cranes, and Heavy Cranes, enable Whiting to supply a complete, fully integrated overhead materials-handling system.

WHITING CORPORATION

15601 Lathrop Ave.

Harvey, Illinois

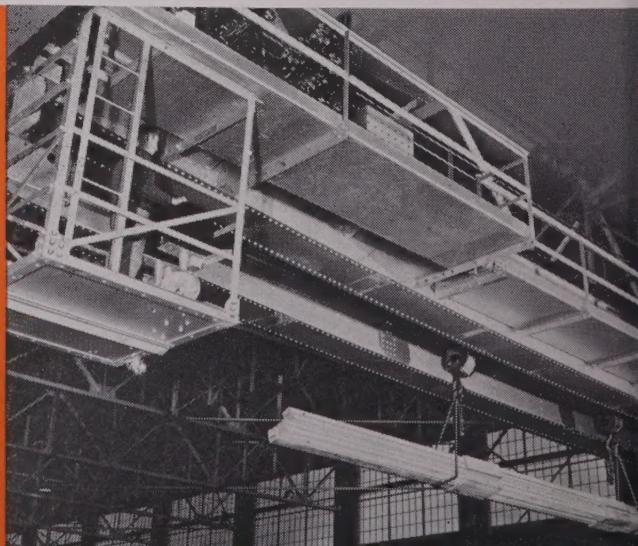
Offices in Chicago, Cincinnati, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, and St. Louis. Agents in other principal cities. Canadian Subsidiary: Whiting Corporation (Canada) Ltd., Toronto, Ontario. Export Department: 30 Church St., New York 7, N. Y.

Dependable • Quiet-Running • Durable

WHITING
Overhead **CRANES**
Traveling

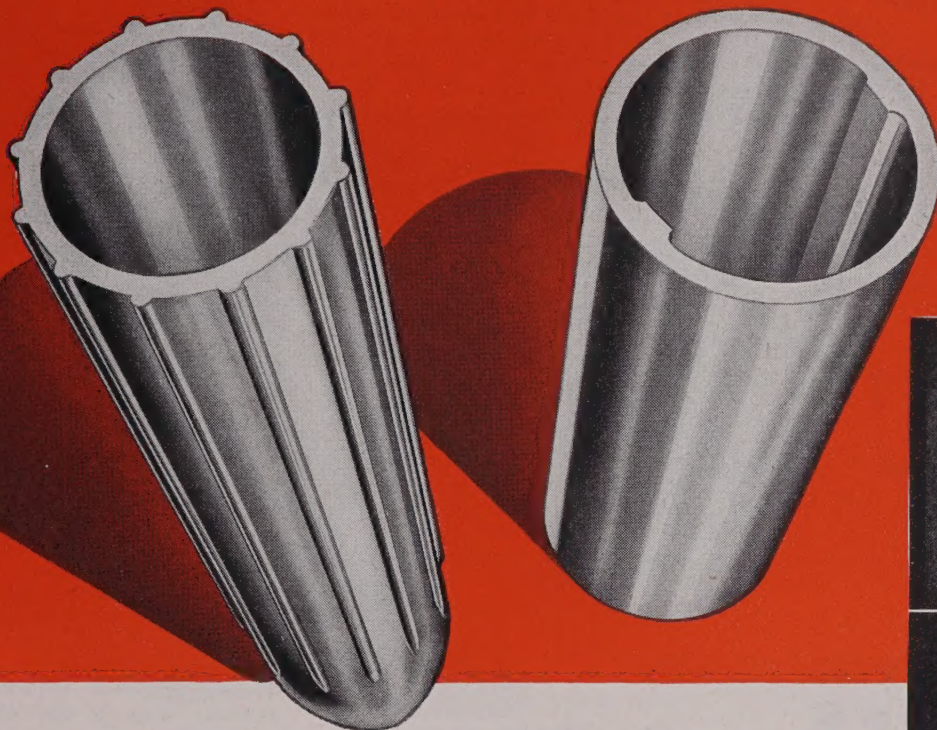
BUILDERS OF QUALITY CRANES

FOR OVER 60 YEARS



VARIABLE WALL THICKNESSES

...FOR BEAUTY OR REINFORCEMENT

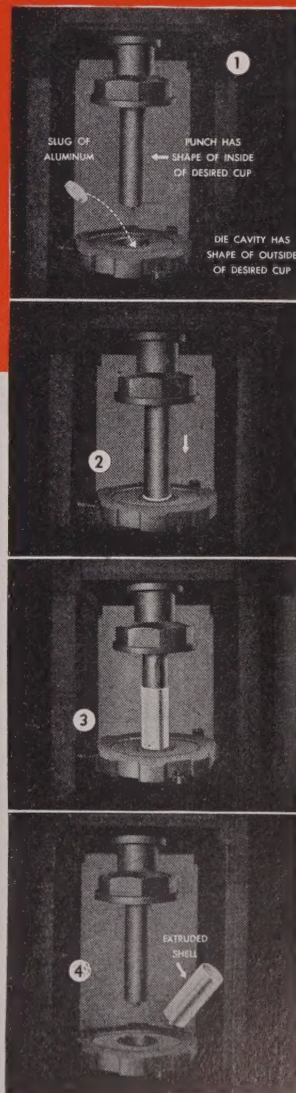


You Get Them at a Single Stroke of the Punch with the Alcoa Impact Extrusion Process

Designing a housing? Shell? Cylinder? Holding chamber for air or liquid? Forget old-fashioned, time-consuming methods. Faster than the eye can follow, the Alcoa Impact Extrusion Presses will form walls and bottom in one piece; strong, sound, low in cost.

Perhaps you want to add inner ribs for reinforcement, or outside fluting for modern beauty. *They can be formed as your part is formed,* with this amazing process. Walls thick enough to tap for fittings? A heavy bottom, or neck? Form them, too, integral with the part, *in the same split second.*

No designer can afford not to know about the shortcuts made possible by Alcoa Impact Extrusions. Write today for your copy of the booklet shown, or phone your nearest Alcoa sales office for a representative. ALUMINUM COMPANY OF AMERICA, 679 Gulf Building, Pittsburgh 19, Pennsylvania.



ALCOA *Aluminum* IMPACT EXTRUSIONS



PAGE

Stainless Steel WIRE

●
ROUND
—
FLAT
OR
~
SHAPED

"Page for Wire—
Especially Stainless"

Remember that the next time you are looking for a responsible source for stainless steel wire. Wire has always been the business of PAGE. And ever since its earliest development, PAGE has been working with stainless.

Whatever problem you may have involving wire—

Get in touch with Page!

ACCO



Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Pittsburgh, Philadelphia, Portland, San Francisco, Bridgeport, Conn.

PAGE STEEL AND WIRE DIVISION
AMERICAN CHAIN & CABLE

In Business for Your Safety

Fatigue Cracks

BY C. T. POST

Finis

• • Detroit, as is popularly supposed, lacks the initiative to create anything fresh and original. But give the automotive wizards an inventor's model, and the first thing you know the assembly lines have turned the germ of an idea into a national epidemic.

This is all well and good most of the time. A gadget weaned in Muncie is likely to reflect the needs of the great wholesome American public. But a Detroit inspired item in last week's f.f.j. fills us with alarm: "During the past week there have been some delays reported on both Oldsmobile and Cadillac orders, which had appeared to be ready for finalization."

Finalization obviously is one of the dandelion seeds of bureaucratic double-talk wafted from Washington. It has the aura of importance, the easy familiarity of a loose woman, and the profound meaning of absolute vacuum. Streamlined by Detroit designers, put into mass production, and launched at the Waldorf-Astoria by the promotion department, a word like that would soon be on every tongue in the land.

When Hollywood got hold of it, no more would you hear Humphrey Bogart snarling to Trigger Mike, "I'm through with the Weasel. Bump him off!" No! It would be, "I'm finalized with the Weasel. Finalize him!"

Except when Form 1040 rolls in, we've never been too much concerned about governmental idiom. But if this sort of talk is going to be Detroitized, Washington will have to be finalized. That ends it!

Process

• • The effect of Washington upon the nation's semantic morals never was better illustrated than in the corruption of the good old Anglo-Saxon noun, *process*.

In the mad conversion to war production, Washington converted *process* to a verb, took it away from the people who make things, and applied it as freely as the date stamp to every piece of mail that came into the city.

When the Bureau of the Budget was assigned the job of simplifying and consolidating government forms, its crowning triumph was a letter which could be used by every federal office in the land in replying to all inquiry correspondence. It read simply:

"Your communication has been received and will be processed promptly."

Six months later it was a good bet that the writer of the original letter had attempted to probe the depths into which his application or entreaty had fallen. Everyone from the Local OPA Ration Board to the Bureau of Fisheries automatically sent out Letter No. 2 to the entire mailing list:

"Processing of your communication is proceeding at the proper level, and final determination is pending in accordance with government policy."

Nothing was ever finalized. But the worst part about *processing* was that it was reconverted to civilian production. Whenever anyone is in doubt about what happens to anything between Points A and B, it is safe to say that it is *processed*. Thus, the newspapers love to say that iron ore is processed into steel, cotton bolls are processed into sarongs, etc. If you will look real hard in your f.f.j., you can always tell when the brains department is tip-toeing around a 67-step technical sequence. The squeaky step is our old friend *processing*.

Powdurgy

• • Don't get the idea that we are Tories about bending a word to make it more expressive. Last week, an F. J. Stokes Machine Co. advertisement (p. 135) graciously stated that "Stokes Advisory Service is confidential, resourceful . . . offers you the experience of 20 years in Powdurgy as a science."

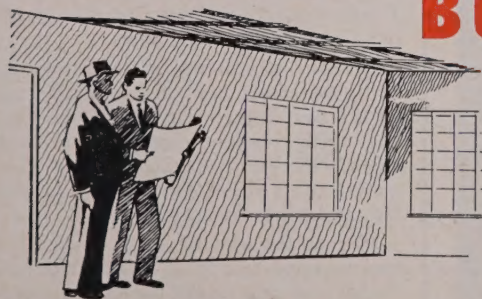
If you confine yourself to the word *Powdurgy* this is probably a little bit of a fib. We doubt if *Powdurgy* is more than a few days old. But, in the larger sense, Stokes was one of the pioneers in powder metallurgy equipment. Their salesmen and advertising writers understandably were worn out by juggling "powder metallurgy." As naturally as a Stokes press compacts iron powder, this was compressed to *Powdallurgy*. And recently, with an additional squeeze, it became *Powdurgy*. You can see this final transition in last week's advertisement. The heading says "Design for Powdallurgy* production . . ." If you follow the asterisk down, you find "Powdurgy* should be considered . . ." You lucky f.f.j. readers were midwives at the birth of a highly expressive word that says exactly what it means.

HERE'S HOW...

35 ft. long factory-built Lindberg double-deck continuous bright hardening and tempering strip furnace installed at Thomas Steel Company, Warren, Ohio.

180 ft. long field-erected Lindberg Vitreous Enameling Furnace installed at Lustron Corporation, Columbus, Ohio.

...TO BE SURE OF YOUR CHOICE WHEN BUYING BIG FURNACES



When you're planning to install a large furnace for hardening, tempering, annealing, or normalizing, one of the big questions you'll ask should be—"Is it possible to have this furnace factory-built and shipped to us in one or several freight-car-size sections—or must we have it built from the ground up—here in our own plant?"

Each method has its advantages. Lindberg can recommend which method will be best for you—for Lindberg builds big furnaces *both* ways.

IN FAVOR OF FIELD-ERECTED FURNACES

A furnace having an overall width of more than approximately 11 ft. (freight car clearance width) *must* be built in the field. In such a case, of course, there is no limitation on size or shape—no possibility of having to knock out walls or disturb other equipment to move the furnace into place. There is only one shipping and handling cost for some of the materials. Certain economies are possible where the furnace is built on a permanent foundation. Your own men and engineers can check step-by-step progress of furnace erection.

IN FAVOR OF FACTORY-BUILT SECTIONALIZED FURNACES

If the furnace is factory-built in one piece or easily joined sections, you can save time on delivery—have the furnace built by specialists with the best equipment available—avoid the inconvenience of receiving and storing materials—eliminate mess and loss of floor space during construction—and avoid having outside workman in your plant. Should you later wish to move the furnace to another location this can be done with ease.

When a question arises relative to big furnaces, call a Lindberg Engineer. He will be concerned with *your* problems because Lindberg builds big furnaces *either* way.

LINDBERG ENGINEERING COMPANY

2452 W. Hubbard Street, Chicago 12, Illinois

LINDBERG



FURNACES

CLARK



COMFORT
CONDITIONING
DUNHAM

**"We
'comfort conditioned'
our profits by using
CLARK fork trucks"**

Nothing is more conducive to managerial contentment and executive peace of mind than adding up the substantial savings effected by Clark Materials Handling Machines.

For example:

"Our Clark fork trucks cured several Materials Handling headaches, and stepped up productive capacity by speeding the flow of materials. Handling costs dropped more than 30 percent—substantial savings which, to use our own slogan, 'comfort conditioned' our profits. We find jobs for these machines—don't know how we ever got along without them."

F. E. Schmidt, Vice President
C. A. Dunham Company
Chicago, Illinois

There's strong likelihood that uncompromising examination of the average materials handling operation will disclose opportunities to make sizable cuts in costs, and rich promises that can be fulfilled quickly and most economically by a planned application of Clark's Modern Methods. And remember this: Clark builds both gas and electric battery-powered machines. You're sure of an unbiased recommendation when you CONSULT CLARK.

CLARK ELECTRIC AND GAS POWERED FORK TRUCKS AND INDUSTRIAL TOWING TRACTORS



INDUSTRIAL TRUCK DIV., CLARK EQUIPMENT COMPANY BATTLE CREEK 51, MICH.
REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE WORLD
AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS

Dear Editor:

STAINLESS STEEL DISCOVERY

Sir:

I read the article "Who Discovered Stainless Steel" in the issue dated Oct. 14, and could not resist directing the author's attention, and yours also, to as much as we know from Brearley himself on this subject. In his book "Knotted String," Brearley provided a chapter entitled "Stainless Steel" which deserves to be read in full for appreciation of the circumstances surrounding the birth of stainless steel. The best way to bring Brearley's comments to light, I believe, is simply to provide extracts from this chapter.

Brearley writes "Shortly after the date of this report (October 1912) a series of steels, varying in chromium content between 6 and 15 pct, were made by the crucible process. None had quite the mechanical properties desired . . . and, as anticipated, the resources of the electric furnace had to be used. The first electric furnace cast was not satisfactory, but the second was very pleasing. The original suggestion was that steels of this kind would probably possess properties that could be usefully applied in the manufacture of rifle barrels and the inner tubes of guns.

"The reader will observe that my early work on high chromium steels was not inspired by any intention or hope of discovering a stainless steel. I was simply studying certain problems relating to ordnance.

"When microscopical observations of these steels was being made, one of the first things noticeable was that the usual reagents used for etching would not etch, or etched very very slowly those steels containing low carbon and high chromium.

"From the end of 1913 onwards, I lost no opportunity of urging the usefulness of this steel for cutlery purposes . . . But from records which came into my possession at a later date, I knew that after several months, the steel was reported to be useless for cutlery purposes on account of the difficulties in forging, grinding and hardening."

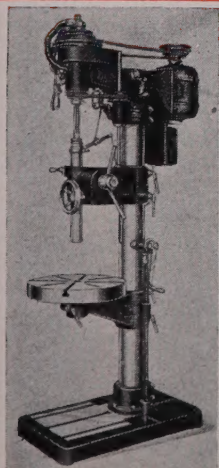
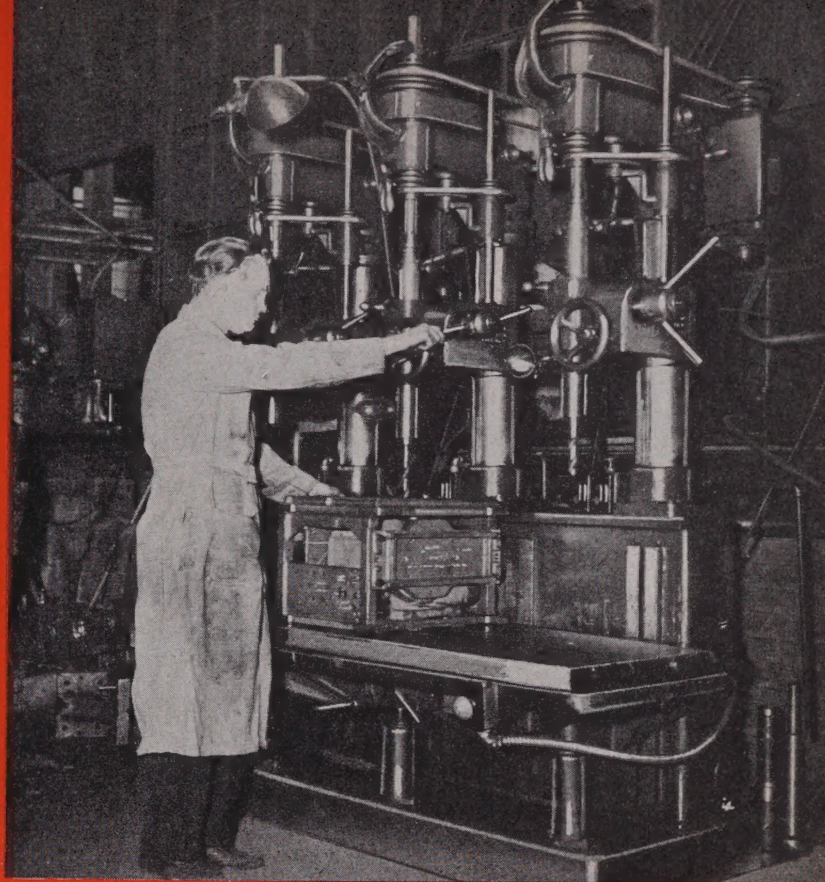
Speaking of a later production of cutlery blades, in which Brearley himself had a part and personally specified temperatures at which the steel could be most easily worked and most efficiently hardened, Brearley reports that sample knives were made and distributed for trial with the request that they should be returned if by contact with any food, fruit or condiment they should be stained or caused to rust. "Not a single knife failed at this test and before 125 lb of steel had been worked into knives, the cutler pre-

*Easy Handling
Fast Set up
Changes*

**Speed up the
LARGE DRILL**

Operations

with *"Buffalo"* No. 22 Drills



● Drilling up to 2" holes in cast iron no longer requires a cumbersome, hard-to-operate machine! The "Buffalo" No. 22 Drill combines the necessary rigid strength for such drilling with quick maneuverability of controls. Many manufacturers are slashing time and costs on large holes with this accurate, easily handled machine. Available in single or multispindle models, as your operation requires.



Get Bulletin 2989-F For Your Files! Look into the many sound engineering features of the No. 22 that mean better turnout for you on the large-hole jobs!

MACHINE
TOOLS
BY *"Buffalo"*

PUTTING MORE PROFIT INTO YOUR OPERATION

**BUFFALO FORGE
COMPANY**

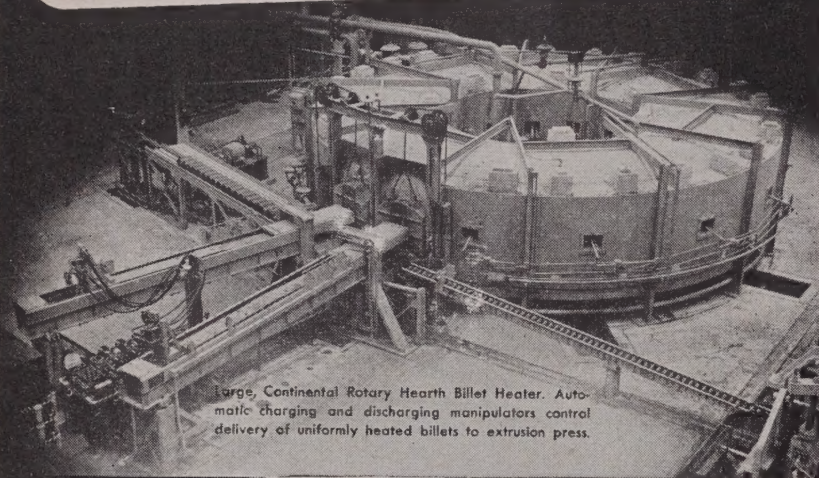
492 BROADWAY BUFFALO, N. Y.
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

**DRILLING PUNCHING
SHEARING CUTTING
BENDING**

CONTINENTAL

For the OVER-ALL JOB—With Guaranteed Results in

FURNACES • OVENS • DRYERS



Large, Continental Rotary Hearth Billet Heater. Automatic charging and discharging manipulators control delivery of uniformly heated billets to extrusion press.

PRODUCTION UNITS

BUILT FOR

Nitriding
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Billet Heating
Metal Coating
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Ore Smelting
Salt Baths
Soaking Pits
Forging
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**Electric or
Fuel Fired**

for planned performance

Whatever your problem in any industrial heating process, CONTINENTAL has the solution.

CONTINENTAL planned performance starts with the analysis of your problem and production requirements. It carries through with the selection and development of the best methods, estimates costs and savings, designs and builds the equipment, and provides the work-handling accessories and control devices. Furthermore, CONTINENTAL handles the complete installation, turning over to you a unitized, producing job with guaranteed results.

Our 25 years' experience and diversified research have produced numerous original designs and improved procedures. All of this data is available for preliminary planning. CONTINENTAL invites you to share its engineering "round table" to discuss the expansion, remodeling, or modernizing plans you have in prospect. There is no obligation.

CONTINENTAL INDUSTRIAL ENGINEERS, INC.

176 W. Adams Street, Chicago 3, Illinois

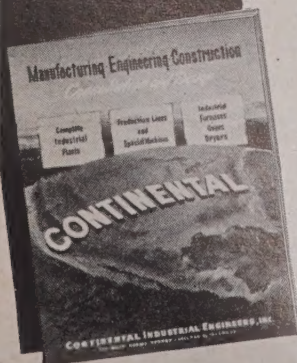
District Representatives:

Ridgewood, N. J. • Indianapolis • Cincinnati • Milwaukee
St. Louis • Detroit • Cleveland • Pittsburgh

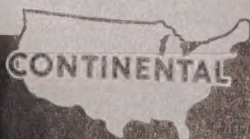
Every Metalworking Plant Needs CONTINENTAL

Write for This New Booklet No. 127

See How CONTINENTAL Can Help You.



**FURNACES
PRODUCTION LINES**



**SPECIAL MACHINES
COMPLETE PLANTS**

MANUFACTURERS—ENGINEERS—CONTRACTORS FOR OVER A QUARTER OF A CENTURY

dicted a future for stainless steel cutlery.

"The reader may well ask why patents were not applied for in 1913 or 1914. The answer is that no man takes out a patent for something he considers worthless. My ideas may have been too optimistic . . . and, as by the terms of my engagement, I believed a patent could not be applied for in my name alone."

For the purpose of this letter, extracts from Brearley's chapter can finish at this point. The chapter reads on and further unfolds the story of the American patent and the development of the steel. Brearley died in July 1948. His own story of this great invention lies deposited in a sealed envelope with the Cutlers Company in Sheffield who may not open it until 1960. Until the facts of this story are revealed, however, I feel that any bibliography of literature on this subject omitting reference to chapter VI in Brearley's own book "Knotted String" is incomplete.

J. E. HURST

Lichfield—Staffs, England

● Carl A. Zapffe, author of the article "Who Discovered Stainless Steel," comments as follows: "In preparing the article, the entry of Brearley into the story was carefully studied both on the basis of his own accounts and the accounts of numerous historians, biographers and patent records. His retelling of the story in chapter VI of "Knotted String" added nothing to the known record; and this reference was omitted, along with many others, for the sake of the reader who would become discouraged if the important original documents were to be buried in the countless number of rehash articles that have appeared.

"No question is raised in THE IRON AGE article as to Brearley's position as a great and key figure in the development of our modern stainless steel industry. However, as for the tribute of 'discoverer' so repetitiously misapplied to Brearley, the article simply calls attention to records which prove that such designation is in error.

"Reading Brearley's own statements, quoted above by Dr. Hurst, one finds his failure to patent in 1913 and 1914 due to his belief that the alloys were worthless. Monnartz and Borchers didn't believe them worthless; and a patent was filed and granted to these men several years before the earliest date that Brearley has ever claimed."—Ed.

AIRPLANE BOOKLETS

Sir:

I am a student of 14th Ave. School, Newark, N. J., and I would like to know if you can send me small booklets on airplanes. My teacher has told me to send for them. It is my teacher's permission. Please try to send them. We need them badly.

THERESA PETRONE

Newark, N. J.

● A booklet is being sent, containing photos of modern aircraft, through the (CONTINUED ON PAGE 67)

Pays for itself in **5 months**



When the Rotor Application Engineer called on this manufacturer of materials handling equipment, he found the shop using universal electric grinders for grinding welds. He pointed out the possibilities for cutting costs with Rotor Air Grinders and demonstrated them with these results:

Cuts grinding time in half due to greater cutting power . . . higher speed under load.

Savings pay for tools in 5 months due to reduced man-hours for grinding. An annual return of 240% on investment.

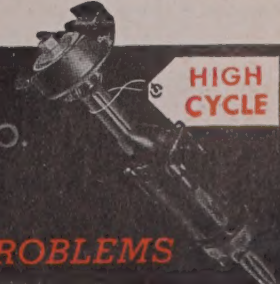
Improves working conditions because Rotor air tools are lighter in weight and run cool even on hot summer days.

Would you like similar benefits? Just call the Rotor Application Engineer.

AIR O'TOOL

**AIR**

THE ROTOR TOOL CO.
CLEVELAND, OHIO

**HIGH CYCLE**

UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS

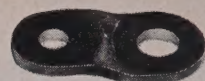
HOW 2600 PIECES PER HOUR ARE COMPLETED



Danly 1-Point 100-Ton Eccentric Geared Press at Chain Belt Co., Milwaukee, handling punching operations automatically.

on a

DANLY 100-Ton PRESS



1/4" Thick Bar
Pierced and Shaved
in one operation.

Equipped with Magazine Feed

Here's how a Danly Straight-Side Press equipped with an automatic magazine feed and spring-loaded ejector cuts stamping costs by eliminating slow, hand-feeding operations. With unusual speed and precision, two holes are punched and shaved simultaneously in 1/4" AISI 1335 stock. A two-step punch eliminates secondary operations. The pieces, which have been blanked and formed in a preceding operation are fed, positioned, and ejected automatically by means of a link and slide mechanism operated by an eccentric on the end of the main shaft. Operated continuously at a speed of 45 strokes per minute, a part is completed and ejected with each stroke of the press. A net production rate of 2,600 pieces per hour is attained.

Precision Tolerances Maintained

Because of the extra rigid Danly press construction including a solid-type bed, deflections are reduced to a minimum and precision tolerances maintained. Likewise, the accurate-operating Danly press slide and a 2-post Danly Precision Die Set help maintain an unusually close tolerance on the hole centers. The result is higher production and better quality at less cost.

Other Important Danly Features

Other Danly press features which contribute to high production efficiency and lower stamping costs include:

- Built-In Automatic Oiling System—puts right amount of clean, filtered oil where needed, including flywheel bearings.
- New Floating Friction Block Clutch—air cooled and air operated—performance tests show 8 million consecutive engagements with negligible wear.
- Pitman Wrist-Pin Design—assures closer operating tolerances—longer die life.
- Extra Sturdy Welded Steel Frame—All weldments stress-relieved before machining—assures permanent alignment—permits adapting standard or special stock handling equipment to suit needs.
- Wide Range of Standard Press Sizes—High production sizes from 50 to 800 tons. Straight-Side units up to 3,000 tons.

JOB FACTS

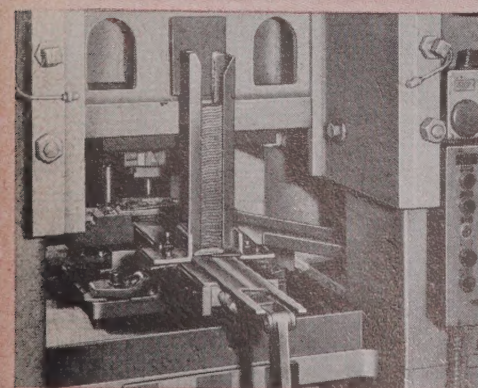
Part Name: Offset side bar for transmission chain.

Material: AISI 1335.

Dimensions: Length 3.706", Width 1 5/8" to 1 7/8", Thickness 1/4".

Job: Punch two holes of approximately 9/16" and 7/8". Hold precision tolerances on hole sizes and centers.

Rate of Operation: 45 strokes per minute. Net production 2,600 pieces per hour.



Close-up showing magazine feed

Write today for more facts on
DANLY PRESSES



DANLY MACHINE SPECIALTIES, INC.
2200 SOUTH 52ND AVENUE, CHICAGO 50, ILLINOIS



25 YEARS OF DEPENDABLE SERVICE
TO THE STAMPING INDUSTRY

SAMPLING TECHNIQUES

Sir:

I would appreciate obtaining a copy of "Sampling Techniques Applied to Quality Control" from the Dec. 12, 1946 issue. It has been recommended as being of value in a number of the courses I am taking at the Illinois Institute of Technology.

GEORGE J. HRUSKA

Chicago

GRAIN REFINEMENT

Sir:

We have been deeply interested by the article "Grain Refinement in Cast Aluminum" which appeared in the issue of Jan. 20, and would like to have another copy for our files.

P. A. GOBEIL
Metallurgical Engineer

Dominion Foils (Canada) Ltd.
Cap de la Madeleine, Quebec

F. O. B. MILL PRICING

Sir:

We would very much appreciate obtaining two copies of the article "F.O.B. Mill" appearing in the annual review issue of Jan. 6.

THOMAS E. DARTON
Supervisor of Standards

Oldsmobile Forge Plant, General Motors Corp.
Lansing, Mich.

TOOL STEEL DIRECTORY

Sir:

We have one copy of the "Directory of Tool Steels" and find it very useful in our engineering and estimating departments. We would now like to order two more copies.

ROBERT H. LEWIS

Acme Industrial Co.
Chicago

● The copies are \$2.00 each. They're in the mail.—Ed.

WIRE DRAWING EQUIPMENT

Sir:

We would greatly appreciate your sending us the names of reliable manufacturers of equipment for drawing ¼-in. diam wire rod to 0.020 in. wire.

BERNARD P. PLANNER
Engineering & Machinery Div.

Schwabach Export Corp.
New York

● A list of companies supplying such equipment has been sent.—Ed.

HILLS OF HEMATITE

Sir:

I shall appreciate receiving a set of tear sheets of the three-part article on Brazilian iron ore, entitled "Hills

Here's Why

we
always
use

CERTIFIED ABRASIVES



They're More Economical . . .

That's right, Certified Samson Shot and Angular Grit are more economical because each grain is a solid homogeneous mass that wears away slowly, lasts longer for top-efficiency blast cleaning at lowest cost.

They're Extra Tough . . .

Extra toughness gives you faster, better cleaning besides longer wear. Certified's special automatically controlled hardening process gives them this toughness. We use 'em over and over again!

So take a tip from me, specify Certified Abrasives for faster, better, cheaper, safer blast cleaning.



All sizes graded to
S. A. E. specifications

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CRUSHED STEEL CO.**
PITTSBURGH, PENNA.

**STEEL SHOT
AND GRIT CO.**
BOSTON, MASS.

Foundation for Safety AW SUPER-DIAMOND FLOOR PLATE



AW SUPER-DIAMOND FLOOR PLATE
A BETTER FOOTING FOR PRODUCT AND PLANT

So easy to plan and build with—so safe and inexpensive. Exclusive engineered design, with Super-Diamonds at 45° angles, gives grip without a-slip safety and makes plates easy to match without waste. Use it for safe, strong, clean loading platforms, fire escapes, walkways, trench covers, running boards, machine tool bases and other product and plant applications.

FREE

16 Page Catalog L-27. It's packed with useful information. Write now.



AW SUPER-DIAMOND FLOOR PLATES THAT GRIP

A Product of ALAN WOOD STEEL COMPANY

Other Products: Permaclad, Stainless Clad Steel • AW Super Grip, Abrasive Floor Plate • Billets • Plates • Sheets (alloy and special grades)



of Hematite," which appeared in the Dec. 16, 23 and 30 issues.

A. L. FAIRLEY, JR.

Shenango Furnace Co.
Pittsburgh

UNIFIED SCREW THREADS

Sir:

I noted the news item "Standardization of Nuts, Bolts and Screws Discussed" in the Jan. 6 issue, and I think that perhaps you can help me by informing me to whom I should write to purchase a copy of the American standards for threads and tapings of the various types.

A. S. NADELLE
Chief Engineer

Advance Pump Co.
Berkeley, Calif.

● Information on the American standards is included in most of the handbooks, such as the "Mechanical Engineer's Handbook," published by McGraw-Hill Book Co., New York. Or, you can obtain a copy of the standards from the National Bureau of Standards, Dept. of Commerce, Washington, who can also supply you with the booklet "Unified Screw Threads," covering the new joint U. S.-British standard discussed in the article.—Ed.

X-RAY ANALYSIS

Sir:

We have noted the article "X-Ray Fluorescence Analysis" in the Oct. 28 and Nov. 4 issues and would appreciate receiving another copy

PHILIP W. RUSH

Universal-Cyclops Steel Corp
Universal Div.
Bridgeville, Pa.

OXIDE FILMS

Sir:

We would like to obtain tear sheets of "Metal Oxide Films at Elevated Temperatures" from the Aug. 12 and 19 issues.

J. T. RICHARDS
Engineer

Beryllium Corp.
Reading, Pa.

MACHINING MOLYBDENUM

Sir:

We should greatly appreciate receiving tear sheets of "Machining High Purity Molybdenum" from the Dec. 9 issue.

H. C. FRIEDMANN
Librarian

American Electro Metal Corp.
Yonkers

HEATING OXIDIZABLE METALS

Sir:

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Production For Use

WITH unemployment reaching disturbing dimensions for the first time in almost a decade and distinct fissures appearing in our monolithic boom, we note the revival of a hoary fallacy. Business is admonished to produce "for use" instead of profit.

As a method for fighting depression the proposal involves nothing new. It has been one of the cardinal planks in the platform of the Fabian socialists and is the ideological backbone of the Administration's program for entering the steel business.

What precisely is production for profit? It means the production of an article which consumers want, of such value to them that they are willing to buy it at a price and in quantities which will permit the producer to recover all his costs plus a decent wage for himself, a reasonable return for capital and a fair compensation for risk.

Note that there are two elements in this definition. The first calls for the satisfaction of the consumer. Within the premise of a free society under which the consumer is not yet compelled to buy what he does not want or pay a price which he thinks is excessive, the full burden of satisfaction rests on the producer. Bear in mind also that this producer rarely enjoys a monopoly, that he is constantly matching his efforts with other producers seeking the favor of the consumer. In other words, the consumer is a sovereign—sometimes a fickle and capricious sovereign—who may switch his favor for good reason, or no reason at all. This is as it should be in a free society.

The other element in our definition is the position of the producer. He keeps a set of books which records his outlay for material, labor, depreciation, repair, advertising (appeal to the consumer), and taxes (the totally non-productive tribute to government). Whatever is left goes to the owners in the form of dividends or remains in the business in the form of added capital.

It must be obvious that the failure to cover any of these necessary items on the cost side will entail the ultimate failure of the business. There is nothing mysterious about production for profit—or reprehensible. It is simply plain horse-sense bookkeeping.

How successful have the liberals been in operating a business "for use" instead of profit? In the late afternoon of January 27th the management of *The Star* assembled its 408 employees and told them that the next day would be their last. The paper had been the successor of *PM*, a journal which for five and a half years had "bobbled in and out of the fiscal red and the political pink." During this period an angel named Marshall Field had enabled the enterprise to "produce for use" instead of for profit.

With the departure of this financial Lucifer, *PM's* successor appeared for exactly 186 issues. Here was a chance to continue production for the benefit of 140,000 readers. Here was a duty, repeatedly and earnestly expounded to all capitalist managements, to maintain employment for 408 workers, all of whom presumably were enlightened, progressive and fully deserving.

The answer, of course, is one of simple addition and subtraction. The well-meaning advocates of "production for use" merely wish to change or defy the elementary rules of arithmetic.

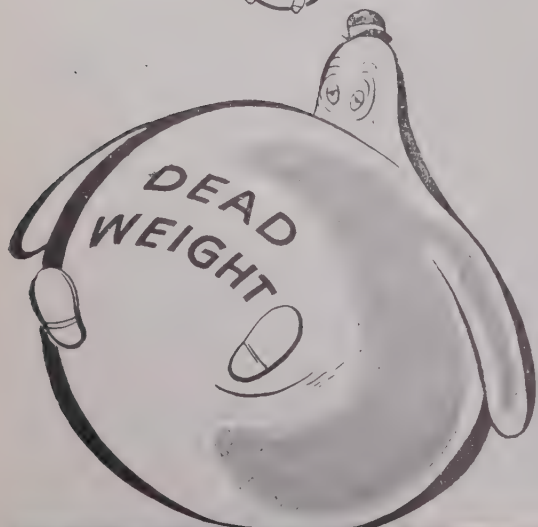
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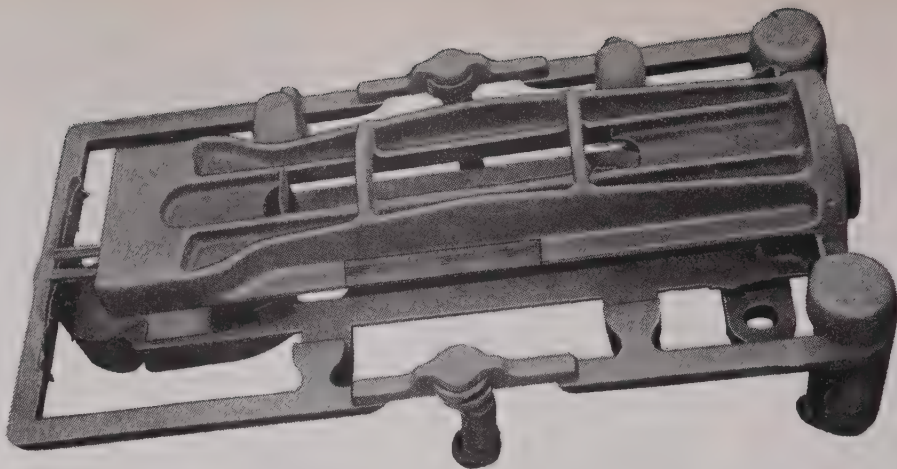
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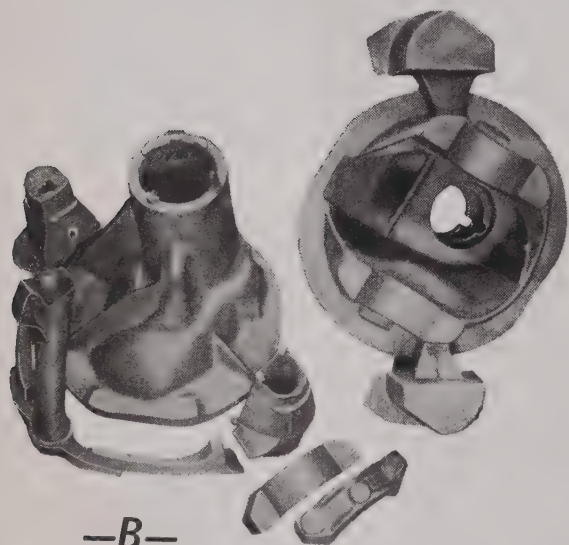
THE LOW-ALLOY HIGH-STRENGTH STEEL

- Newspaper reports that the Pennsylvania R. R. was acquiring 4000 acres of land on the Delaware River near Trenton, N. J., for U. S. Steel's Eastern plant have caused a few small landholders to hold out for more money. Fact is that only 1600 acres of the tract are earmarked for U. S. Steel—when or if the corporation decides to build a plant there.
- Recent reports that U. S. Steel has been meeting with union officials to talk over 1949 contract changes are not true. Talks have been held on other matters pertaining to old contract items. And negotiations have continued on the insurance package question growing out of the 1947 contract. But it is too early yet for either side to spar around over what they will face this June when exploratory meetings are held.
- The Big Three in the auto industry are getting bigger. Latest registration figures for the industry show that 90 pct of the total cars in operation were produced by GM, Chrysler or Ford. Total Chevrolet truck registrations this year passed Ford for the first time.
- On the basis of present expansion plans, the natural gas industry will be a good steel pipe consumer for some time. Programs already approved by the Federal Power Commission could absorb the entire 1949 production of line pipe. Applications not yet acted upon by FPC involves laying of more than 5 million tons of pipe line.
- A large steel company is taking out a license to use a new electrolytic tinplate weight tester originally developed for Inland Steel Co., Chicago. Thicknesses of a few millionths of an inch have been satisfactorily measured with the device.
- Even steel consumers who need more supplies are keeping an eagle eye on inventories. Off sizes and unbalanced stocks are under better control. No longer will the buyers take anything in order to get metal.
- Blade wear in abrading machines using steel shot has been materially decreased by simple design change of these castings. New alloys are being used. But the shape of the blade has been found to be an important factor in affecting wear.
- Hardest hit spot in the motor industry right now is Washtenaw County, Mich., where 4000 workers at Kaiser-Frazer plus a number of employees of parts plants in Ypsilanti and Ann Arbor have been simultaneously shifted to relief roles. In addition, a leading Ypsilanti appliance producer is reported closed for 60 to 90 days.
- Aluminum-beryllium alloys have replaced spring steel for camera shutter applications in the case of one large maker. The thin strip is subjected to high strain. The aluminum-beryllium alloy is not only lighter but is expected to wear longer than the spring steel grade formerly used.
- Effect of the stockpiling program may be more evident in coming months. The Munitions Board plans purchase of more materials needed for domestic industrial economy. The board will try to lighten direct effect by: (1) Placing orders for longer term delivery, and (2) trying to get more materials abroad. Foreign purchases through ECA over the past six months are just beginning to show up.
- Midwest foundries which were running around madly a few months ago trying to get pig iron are now slowing down to a trot. It's easier to get. The present lower rate of foundry operations plus an improved supply picture are responsible. Like the steelmakers, pig iron producers are going to find it desirable to sell a large share of their output in their own back yards. Cutbacks of Detroit buying from Daingerfield, Tex., are already reported.
- Chances for authorization of the long kicked-around St. Lawrence Seaway project by the 81st Congress appear brighter than ever before. Opposition to the project by sectional interests is waning. But opposition by die-hard opponents is still an important factor. The iron ore shortage in the United States coupled with the proving of millions of tons of high grade ore in the Quebec-Labrador area are seen as strong factors in influencing a trend toward authorization of the project.
- Correction: The Jan. 27 Newsfront referring to a corrosion problem at a Bishop, Tex., plant was exaggerated and partly in error. It was a Celanese Corp. of America plant. The corrosion problem resulted from a misapplication of stainless clad steel of which the company was aware at the time of installation. The grade used was merely a temporary expedient. Experimental work has indicated that aluminum bronze would provide best service results for this particular application.

FIG. 1—Typical parts produced in ductile cast iron, processed under commercially operating cupola conditions. Shown at *A* is a slack adjuster; *B* is a gear carrier and straps; *C* a commutator end, while *D* is a group of crankshafts.



—A—

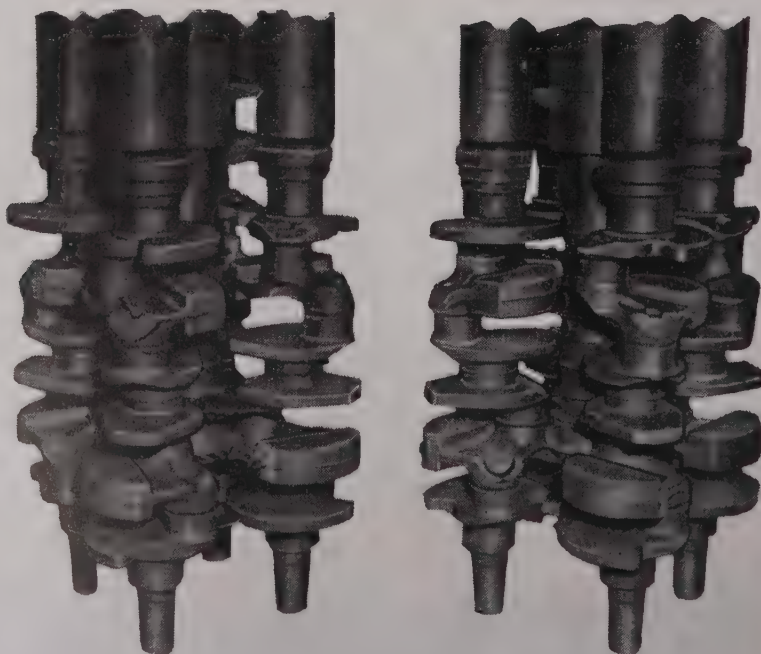


—B—

A new engineering material which combines the process advantages of cast iron with the product advantages of cast steel is described by the authors. Closing the gap between cast iron and cast steel, this material is characterized by a graphite structure wholly in the form of spheroids. Its excellent physical properties, particularly high elastic modulus, high yield strength and high ductility, suggest its suitability for many applications heretofore considered beyond the scope of cast iron.



—C—



—D—

Ductile Cast Iron

—A new engineering material

By ALBERT P. GAGNEBIN

Research Metallurgist,

and

KEITH D. MILLIS

Research Metallurgist,

and

NORMAN B. PILLING

Director, Research Laboratory,

International Nickel Co., Inc.,

Bayonne, N. J.

A CAST material, possessing high strength, high elastic modulus and, in appropriate compositions, a substantial amount of ductility, has recently been developed. This material, referred to as ductile cast iron, has all the advantages of carbon from the process viewpoint: low melting point, good fluidity and castability, ready machinability and, particularly important, low cost.

This new material was first announced at the AFS meeting in Philadelphia, May 7, 1948.¹ In

this discussion, it was stated that the process for making this new material "is based on the introduction into the iron of a small but effective amount of magnesium or a magnesium-containing addition agent, such as nickel-magnesium alloy. A small but effective addition produces a partial conversion of graphite to the spheroidal form and the remaining graphite takes on a compact form. A larger addition insures that all of the graphite is converted to the spheroidal form and, as the amount of spheroidal graphite is increased

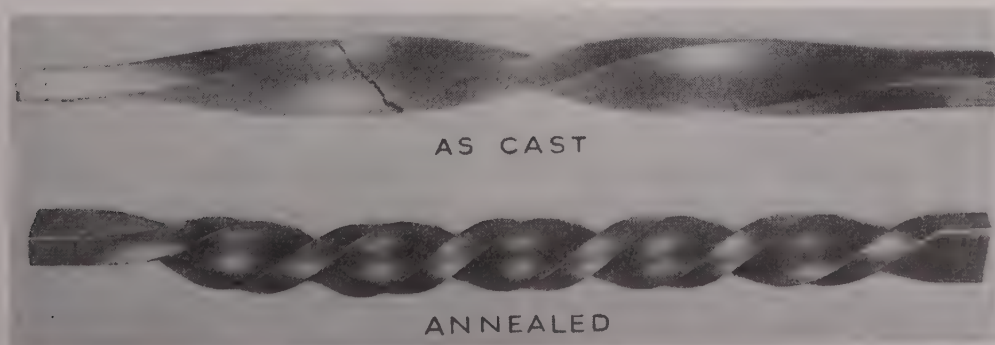


FIG. 2—Ductile cast iron specimens machined flat from keel bars and twisted. The iron analyzed 3.5 pct C and 2.2 pct Si.

TABLE I

Comparison of Mechanical Properties of Cast Iron Containing (1) Flake and (2) Spheroidal Graphite

Condition	Tensile Strength, Psi	Elong., Pct ¹	Izod-AB ² Impact, Ft-lb
Flake graphite.....	17,000	<0.2	22
Spheroidal graphite.....	120,000	3.0	97

TABLE II

Mechanical Properties of Ductile Cast Iron in As-Cast and in Annealed Conditions

	Yield Strength (0.2 pct offset)	Tensile Strength, Psi	Elong., ¹ Pct	Bhn
As cast.....	67,000	99,100	5.0	246
Annealed.....	52,000	72,000	17.5	170

TABLE III

Range of Properties Obtainable from Ductile Cast Iron, As Influenced by Phosphorus and Manganese Contents. Tests Conducted on 1.2-in. Arbitration Bars.

Base Iron Composition	Tensile Strength, 1000 Psi	Transverse 12 in. Span		Izod-AB ² Impact, Ft-lb	Bhn
		Load, 1000 Lb	Defl., In.		
3.2-3.6 C, 1.8-2.5 Si, 0.3 max Mn, 0.05 max P.....	95-105	9-10	0.35-0.70	120+	230-260
Same as above except higher Mn and P.....	85-95	8.2-9.2	0.15-0.35	50-120	280-300

TABLE IV

Range of Properties Obtainable from Ductile Cast Iron, As Influenced by Phosphorus and Manganese Contents. Tests Conducted on 0.505 Tensile Bars.

Base Iron Composition	Yield Strength (0.2 pct offset), 1000 Psi	Tensile Strength, 1000 Psi	Elong., ¹ Pct	Bhn
3.2-3.6 C, 1.8-2.5 Si, 0.3 max Mn, 0.05 max P.....	50-60	77-98	5.0-10.0	225-240
Same as above except higher Mn and P.....	75-80	85-90	0.5 min	260-300
3.2-3.6 C, 1.8-2.5 Si, 3.6 Ni, 0.10 Mn, 0.04 max P..	91	120	2.5	310

¹ Measured on 2-in. gage section, 0.505 in. diam.

² Modified Izod impact test developed by the International Nickel Co., utilizing an unmachined, unnotched 1.2-in. diam arbitration bar.

in the iron, the strength will also increase from the base level to a value several times that of the untreated product."

¹ Discussion by Thomas H. Wickenden, International Nickel Co., Inc., of the paper entitled "Production of Nodular Structure in Cast Iron," by H. Morrogh, presented at the May 1948 annual meeting of the American Foundrymen's Society; see also THE IRON AGE, May 20, 1948, p. 82.

Structurally, the ductile iron is a cast, high-carbon ferrous product, free from graphite in flake form. In the initial as-cast condition, its graphite content is in the form of spheroidal bodies and for that reason the iron can be considered as spheroidal graphite iron. The production of this iron is simple and can be applied to all common cast-iron compositions melted in the cupola or in any other kind of furnace.

Section Thickness Influence Slight

For pearlitic grades of cupola-melted material containing 3.2 to 3.6 pct C and 1.8 to 2.8 pct Si, the ductile iron provides, in the as-cast condition, a combination of 85,000 to 105,000 psi tensile strength with some ductility. Strength (in contrast to gray cast iron) is only moderately affected by section thickness; for example, with a tensile strength of 90,000 psi in a 1-in. section, 75,000 psi tensile strength will ordinarily be developed in a 6-in. section. Under stress, the iron behaves elastically like cast steel rather than cast iron, having proportionality of strain to stress up to high loads, with a modulus of elasticity of 25 million psi.

A variety of mechanical property combinations can be developed in ordinary compositions by heat treatment. Simple annealing develops ferritic structures which show 15 to 20 pct elongation and 65,000 to 75,000 psi tensile strength. Normalizing and tempering has developed a yield strength of 116,000 psi, a tensile strength of 127,000 psi, and 2.0 pct elongation. Quench-and-draw treatments and additional alloying can be used for higher levels of strength.

Some examples of parts cast of this new material, processed under commercially operating cupola conditions, are illustrated in fig. 1, while fig. 2 shows ductile cast iron specimens machined flat from keel bars and twisted.

For a number of years basic studies on cast irons have been in progress at the research laboratory of the International Nickel Co. From this research work has come the discovery of means whereby deep-seated changes can be invoked influencing the formation of graphite in cast irons. Magnesium has been considered by metallurgists as completely unalloyable with iron. But, if properly controlled, it can be effectively incorporated in molten iron to bring about changes, the one result of which is the formation of graphite wholly in the form of spheroids. One effective way of doing this is by incorporating a nickel-magnesium alloy in the molten iron. Operative with practically all the basic types of cast iron including hypo and hyper-eutectic, ferritic, pearlitic, acicular and austenitic varieties, this new process² can be applied without difficulty in any well-run foundry.

Gray cast iron contains graphite in the shape

of flakes that form a multitude of discontinuities and notches in the matrix and which are primarily responsible for relative brittleness and low strength. Great progress has been made in the

² Patents pending; additional information may be obtained from the International Nickel Co., 67 Wall St., New York.

metallurgy of cast iron during the past 25 years and by means of alloying, carbon control and improvements in melting technique, a wide range of properties has been achieved. The latent qualities of the matrix structure can only partly be realized, however, if graphite is present as flake, and there are inherent limitations to the level of properties obtainable, especially with respect to toughness and ductility. This has created a wide disparity between the properties of cast iron and cast steel, to the extent that many manufactured parts which require moderate, or at least some, toughness have necessarily been made of relatively expensive cast steel and the use of malleable iron is mostly limited to light sections and small parts.

It is now possible, with the elimination of these harmful flakes, to make available a low-cost foundry iron which is easily produced, has excellent casting qualities and has physical properties which hitherto have only been obtainable with cast steels.

An example of the changes in structure resulting from the transformation of graphite from flakes to spheroids is shown by fig. 3, which covers a single heat of high carbon cupola iron, the base composition of which is 3.6 pct C and 2.4 pct Si. Fig. 3 (A) shows the microstructure as melted down; it is the familiar structure of a pearlitic iron with long graphite flakes. Fig. 3 (B) is the same melt after processing to transform the graphite. These micrographs show the structure as-cast without any subsequent heat treatment, and they reveal graphite as dispersed spheroids, each partially sheathed in ferrite, and a pearlitic matrix. Flake graphite is completely absent.

The mechanical properties corresponding to these structures are given in table I.

Annealing Improves Ductility

The possibilities for high ductility are most fully realized if the pearlitic matrix is broken down by annealing. Since usually there is little necessity for the presence of carbide stabilizing elements, the transformation reactions proceed rapidly and annealing for a few hours at somewhat below the recalcrescence temperature suffices to decompose pearlite, replacing it with a wholly ferritic matrix. The microstructure thus secured is shown in fig. 4. The changes in mechanical properties brought about by this ferritizing treatment are given in table II for a single heat which contained 3.5 pct C, 2.4 pct Si, 0.8 pct Mn, 1.9 pct Ni, 0.015 pct P, 0.066 pct Mg and 0.012 pct S. (Nickel content of this and other compositions listed in this article is due to incorporation of the nickel-magnesium alloy.)

Graphite form has an important bearing on the elasticity and stiffness of iron. Flake graphite iron does not follow Hooke's law and its apparent modulus of elasticity steadily decreases with increasing stress, as shown in fig. 5. Furthermore,

TABLE V

Mechanical Properties of Some Low Phosphorus Heats in the As-Cast and in Annealed Conditions.

Condition	Yield Strength (0.2 pct offset), Psi	Tensile Strength, Psi	Elong., Pct ¹	Bhn
As cast.....	61,000 60,000	96,000 98,000	7.0 5.0	226 224
Annealed.....	46,500 46,300	76,500 63,900 64,000	11.0 18.5 21.5	143 160

TABLE VI

Effect of Normalizing and Tempering on Mechanical Properties of Ductile Cast Iron.

Normalize	Temper	Yield Strength (0.2 pct offset), Psi	Tensile Strength, Psi	Elong., Pct ¹	Bhn
As Cast		80,000	90,000	0.5	280
1650°F—1 hr	900°F—5 hr	75,500	166,000	0.5	415
1650°F—1 hr	1000	100,000	127,500	0.5	361
1650°F—1 hr	1100	116,000	127,000	2.0	304
1650°F—1 hr	1200	76,500	97,000	6.5	241

¹ Measured on 2-in. gage section. 0.505 in. diam.

TABLE VII

Endurance Properties of Ductile Cast Iron

Condition	Tensile Strength, Psi	Endurance Limit, Psi	Bhn
As cast.....	93,600	41,000	236
Anneal: 1700°F for 15 min; slow cool to 1275°F; hold for 5 hr; air cool.....	75,000	37,000	181
Anneal and temper: 1700°F for 5 hr; slow cool; reheat at 1300°F for 5 hr; air cool.....	63,800	29,000	148

TABLE VIII

Growth Test Data Obtained at 1600°F.

Type of Material	Graphite Form	Composition, Pct				Growth, Pct Increase in Length	Depth of Oxide Penetration, In.
		C	Si	Ni	Cr		
Gray Iron	Flake	3.5	2.5	.....	.....	12.1	0.50
Chromium Iron	Flake	3.6	1.9	0.9	1.3	2.8	0.063
Ductile Cast Iron	Spheroidal	3.5	2.4	1.8		2.1	0.020

A—As melted and cast, without processing



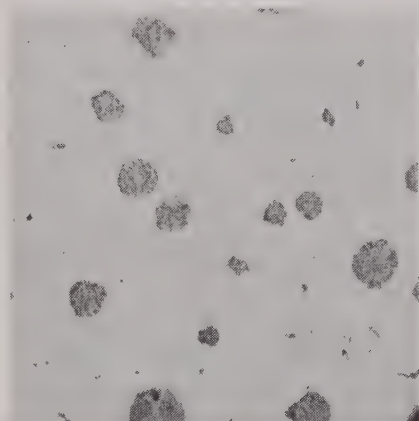
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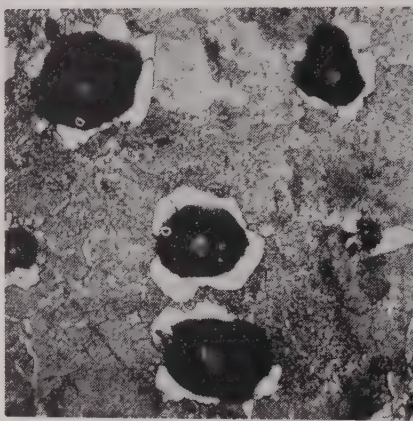
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FIG. 3 — Transformation of gray iron to ductile cast iron, showing the change of graphite from flake to spheroid.

B—As melted, processed and cast



100X



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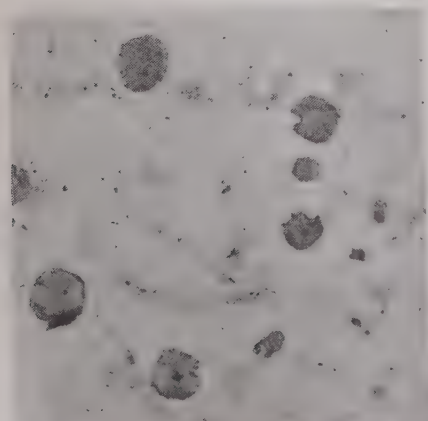
modulus varies inversely with graphite content, so that the average stiffness of flake graphite iron is a function of both its strength and microstructure. The modulus varies from 12 million psi in high carbon iron to 20 million psi in low carbon, high strength iron. Ductile cast iron, on the other hand, behaves like steel and develops proportionality between stress and strain up to high levels of stress.

A typical stress-strain curve, see fig. 5, shows that the ductile iron is elastic, in the generally accepted sense, and is considerably stiffer than flake iron. Furthermore, the amount of graphite

present has a minor effect on the stiffness; modulus of elasticity ranges from 26.5 million to 24.6 million psi, with carbon levels of 2.5 to 3.6 pct.

There is a marked difference between the fracture appearance of gray cast iron and the spheroidal grade. Gray cast iron has a dull, dark fracture, while ductile cast iron has a brilliant fracture, which has been termed steely because of its resemblance to that of a high carbon, coarse-grained steel. The effect on fracture appearance of gradually increasing the proportion of spheroids is shown in fig. 6.

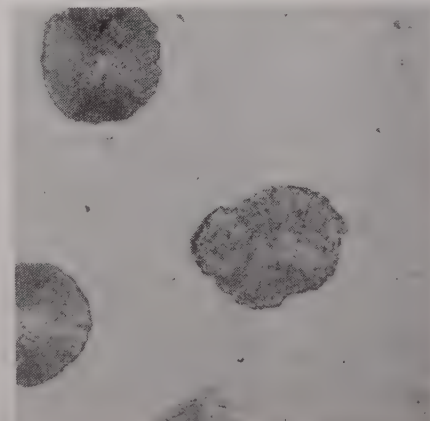
The damping capacity of ductile cast iron is



100X

A—2.1 pct C, 1.9 pct Si

FIG. 4 — Microstructure of annealed sand castings.



250X

B—3.6 pct C, 2.2 pct Si

low in contrast to gray cast iron. This leads to a simple means of distinguishing the two, since the ductile product rings when struck with a hammer.

Mechanical Properties

For general purposes a useful composition of the base iron for ductile cast iron contains: 3.2 to 3.6 C, 1.8 to 2.5 Si, 0.3 max Mn and 0.05 max P. The range of properties expected in the as-cast condition from 1.2-in. arbitration bars of this composition, as well as those departing from it moderately in phosphorus and manganese, are listed in table III.

Another measure of this material, obtained with standard 0.505-in. tensile bars, taken from well-fed 1-in. keel sections, is shown by results in table IV.

Detailed results on both arbitration and tensile bars are given in figs. 7, 8 and 9, which include the influence of variation of carbon and silicon contents. An important result is that the properties are relatively insensitive to carbon over the range of 2.5 to 4.0 pct. In fact, the strength and particularly the toughness improve with increasing carbon. This is demonstrated by the arbitration bar and tensile bar results in figs. 7 and 8. Low-carbon material, in very light sections, may contain some free carbide, but the relative insensitivity to the influence of carbon contrasts sharply to the behavior of flake-graphite iron where the stiffness, strength and toughness are markedly reduced by increasing carbon. The probable reason for the difference is that the spheroidal shape tends to the minimum surface: volume ratio. Consequently, considerable variation in the amount of graphite present has a minor effect on the extent as well as the severity of the notches in the matrix structure.

The fact that excellent properties are secured in the medium and high carbon range, coupled with the feature that the properties are insensitive to the carbon level in this range, provides important advantages from the process viewpoint. Fluidity, castability and machinability are good in this carbon range and the ductile iron can be readily produced from a variety of raw materials.

Silicon has a moderate effect over the range of 1.5 to 2.7 pct and may be adjusted to suit the section thickness or some other metallurgical requirement. At higher levels of over 3.0 pct, silicon has an embrittling effect on ferrite and gradually reduces the strength and ductility.

Toughness and ductility values vary inversely with phosphorus content, up to 0.2 pct, the range commonly found in engineering irons. Larger quantities promote the usual embrittling phosphide network which results in moderately lower strength. Phosphorus does not hinder the formation of spheroidal graphite, however, and it is possible to achieve tensile strengths of the order of 65,000 to 70,000 psi with 0.65 pct P. The properties of some low phosphorus content heats are given in table V. These heats contained 3.15 to 3.60 pct C, 2.0 to 2.3 pct Si, 0.1 to 0.2 pct Mn, 1.8 to 2.0 pct Ni and 0.02 to 0.03 pct P and were cast in well-fed 1-in. sections.

The properties of ductile cast iron are only moderately affected by section thickness. Data in fig. 10 show that commercial cupola irons ranging up to 0.15 pct P with 85,000 to 90,000 psi tensile strengths in 1-in. sections, developed tensile strengths of 70,000 to 80,000 psi in 6-in. sections. Generally a small amount of ductility was exhibited in all sections in the cast condition. Fig. 11 shows the graphite structure in 1, 3 and 6-in. sections.

Short annealing treatments promote a ferritic structure at the expense of pearlite and markedly increase ductility in this material. Over 20 pct elongation can be developed with the low phosphorus composition specified previously. Other data indicate that phosphorus reduces the ductility in the annealed condition; however, approximately 10 pct elongation is achieved with 0.25 pct P, and 5.0 pct elongation with 0.45 pct

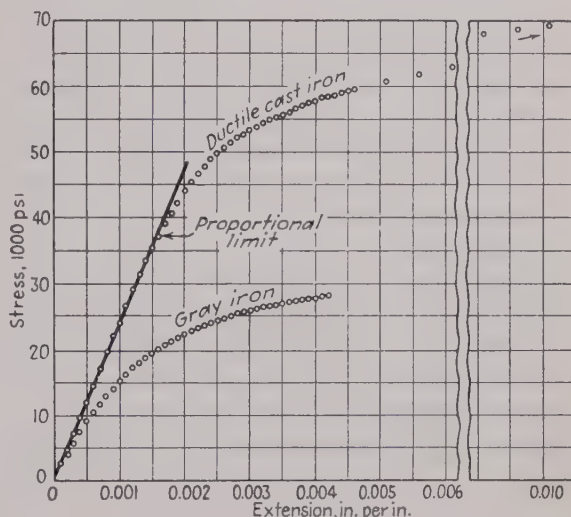


FIG. 5—A comparison of stress-strain curves of plain gray iron (3.45 pct C, 2.10 pct Si) and ductile cast iron (3.7 pct C, 1.8 pct Si).

P. Ferritic structures resulting from annealing appear in fig. 4.

The heavy section properties of a 0.15 pct P cupola iron (fig. 10) show that the yield and tensile strengths are quite uniform in sections ranging from 1 to 6 in. but there is a gradual loss in ductility. The history of some of these heats provides interesting examples of the variety of properties that can be obtained from a single base iron when a method is available to control the graphite form.

The cupola from which the heat in fig. 10 was taken, for example, was aimed at a base iron containing 3.3 pct C, 2.4 pct Si, 0.6 pct Mn, 0.15 pct P and 0.15 pct S, which was being used for soft light section washing machine parts. As flake graphite iron, its strength in light sections was about 25,000 psi and adequate for the service intended. Treatment to provide spheroidal graphite, in conjunction with annealing, converted this iron to one having a tensile strength of 75,000 psi in 3-in. sections with 12 pct elon-

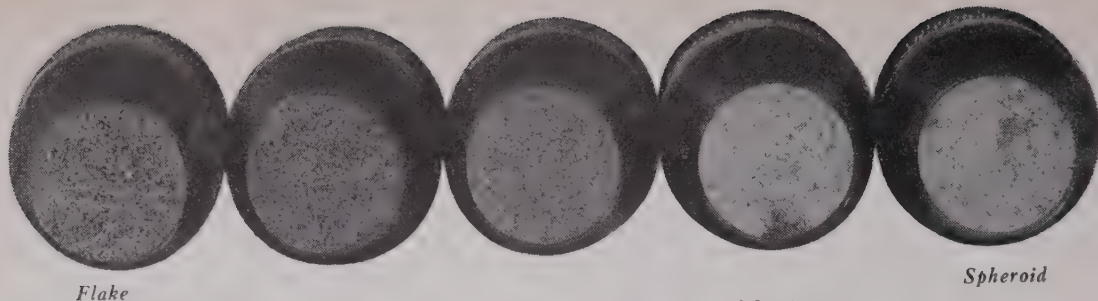


FIG. 6—Effect of graphite form on appearance of fractures.

gation. Thus, control over the graphite form will permit the production from a single base iron of a variety of parts requiring widely different properties.

Since flakeless iron has ductility it is obvious that interesting combinations of properties can be achieved with other heat treatments. The effects of normalizing and drawing on material produced in a commercially operating cupola containing 2.0 pct Ni and 0.80 pct Mn are shown in table VI. With additional alloying and heat treatment, still further opportunities for unusual combinations of properties are at hand.

Endurance Properties: The expectation that the reduction in severe internal notching by the elimination of graphite in flake form should favorably improve the endurance properties, is fully realized. The data (see table VII) from rotating beam fatigue tests on ductile cast iron containing 3.4 pct C, 2.1 pct Si, 0.2 pct Mn and 2.0 pct Ni, are illustrative. The properties of a gray cast iron of similar composition, containing graphite in flake form, were as follows: 41,300

psi tensile strength, 19,500 psi endurance limit, and 230 Bhn.

Heat and Growth Resistance: The susceptibility of gray irons to destructive growth at high temperatures is generally considered to be a consequence of flake graphite affording easy paths to penetration of internal oxidation. Improvements in growth resistance are usually sought by striving toward fine-textured flake and alloying with chromium. The expectation that a complete elimination of flake graphite should importantly limit growth is fulfilled. The data listed in table VIII were obtained in growth tests at 1600°F, in which test bars 1 in. in diam and 3 in. in length were given 100 cycles of treatment consisting in 1½ hr at temperature followed by air cooling for 1 hr. It is significant that the iron with its graphite wholly in spheroidal form, yet free from chromium, surpassed in growth resistance a chrome-nickel heat resisting iron.

Machinability: The important matter of machining characteristics, concerning rates of metal removal, tool life, chip form, quality of cut

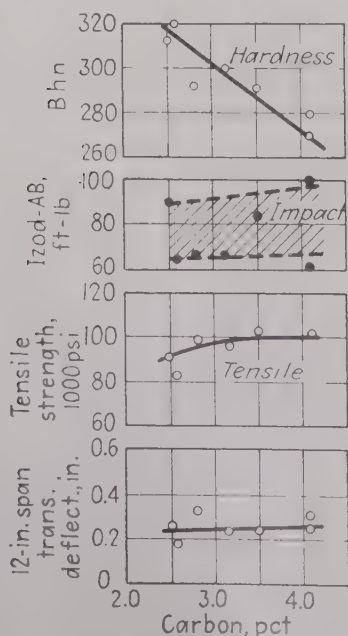


FIG. 7—Influence of carbon on properties of 1.2 in. arbitration bars (1.9 to 3.0 pct Si; 2.0 to 3.0 Ni; 0.5 to 0.8 Mn; 0.02 to 0.05 P).

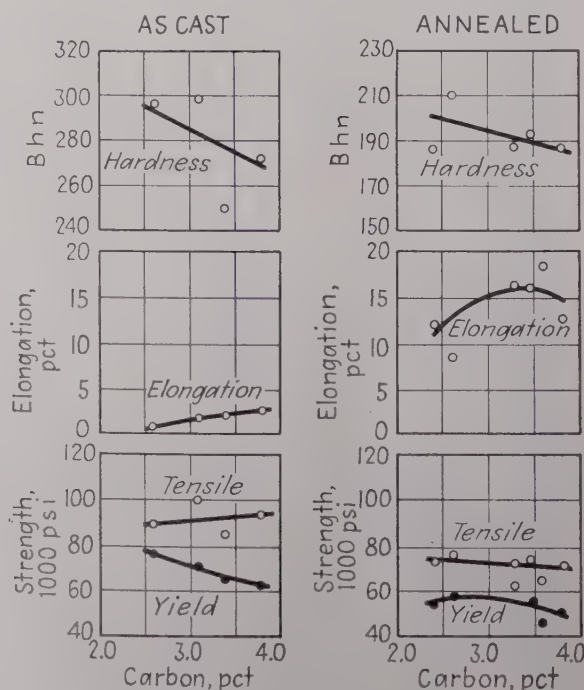


FIG. 8—Influence of carbon on mechanical properties of 1-in. section in as-cast and in annealed condition.

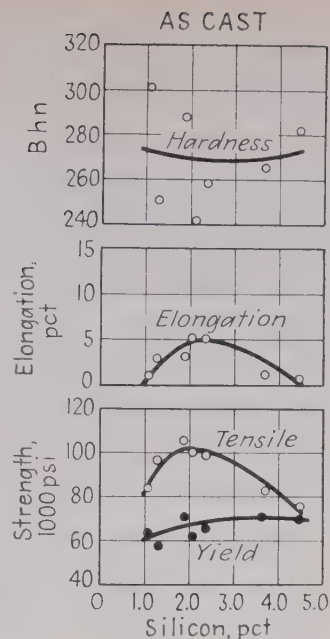
surface, etc., can only be sketched out roughly at this time. In the cast condition, ductile cast iron up to 300 to 320 Bhn has been subjected, without difficulty, to a considerable variety of cutting operations both under experimental and production conditions, and including lathe turning, drilling, milling, shaping and sawing. It is as free machining as gray iron of the same hardness, but much superior to gray irons having equivalent transverse or tensile strengths. The cut surface tends to be smoother, with less tearing than gray iron experiences. In lathe turning ductile cast iron forms a broken chip. In the annealed condition, it tends to cut more like steel, with a continuous chip.

Weldability: The ductile material can be readily arcwelded following the techniques established for gray irons. In using the modern types of weld rod for machinable welds, such as Ni-Rod or similar types of electrode, no difficulty has developed from cracking, but there are some indications of greater hardenability along the weld margin. It is interesting to note that with such rods the spheroidal graphite bodies simply float off into the molten zone and flake graphite is not regenerated.

Casting Properties: Casting quality, after spheroidizing process treatment, is excellent. Fluidity is about the same as gray iron of similar base composition, although feeding requirements are greater. Spheroidized iron has a distinct tendency toward piping, and inadequately-fed sections may collapse inwardly instead of forming porous, internal shrinkages. This characteristic can facilitate the inspection of castings. Gating and risering should follow the practice for low carbon, high strength iron.

A considerable variety of castings of complicated shape have been successfully produced in this material with risers and gates designed for malleable iron. Fig. 1 shows a number of castings from a production line, processed under commercially operating cupola conditions. The slack adjuster, for example, was cast from a tap which

FIG. 9—Influence of silicon on mechanical properties of 1-in. sections in the as-cast condition.

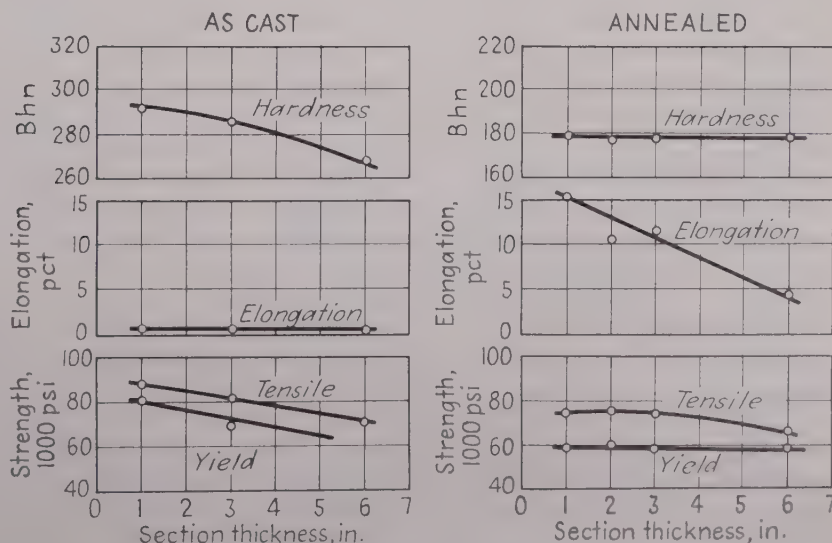


had been reladled twice and its pouring temperature was 2500° to 2550°F.

It is evident that the ductile cast iron described in this article has great flexibility in the range of its mechanical properties and that it closes the gap which has existed between cast iron and cast steel. In the cast condition it is a superior type of iron with high strength, high elastic modulus and, in appropriate compositions, a substantial amount of ductility. Heat treatment modifies its properties still further toward those of cast steel. Combinations of high strength and toughness are available as well as high ductility, if it is needed.

The potential applications for this new material are obviously many and varied. The automotive, agricultural implement and railroad industries could apply it, both as-cast and heat treated, in component parts too numerous to detail. Machinery in general, including machine tools,

FIG. 10—Influence of section thickness on mechanical properties of a cupola iron containing 3.27 pct C, 2.40 pct Si, 2.01 pct Ni, 0.62 pct Mn, 0.15 pct P, 0.055 pct Mg and 0.010 pct S. The annealed iron was slow cooled from 1700°F, held 5 hr at 1275°F, then air cooled.



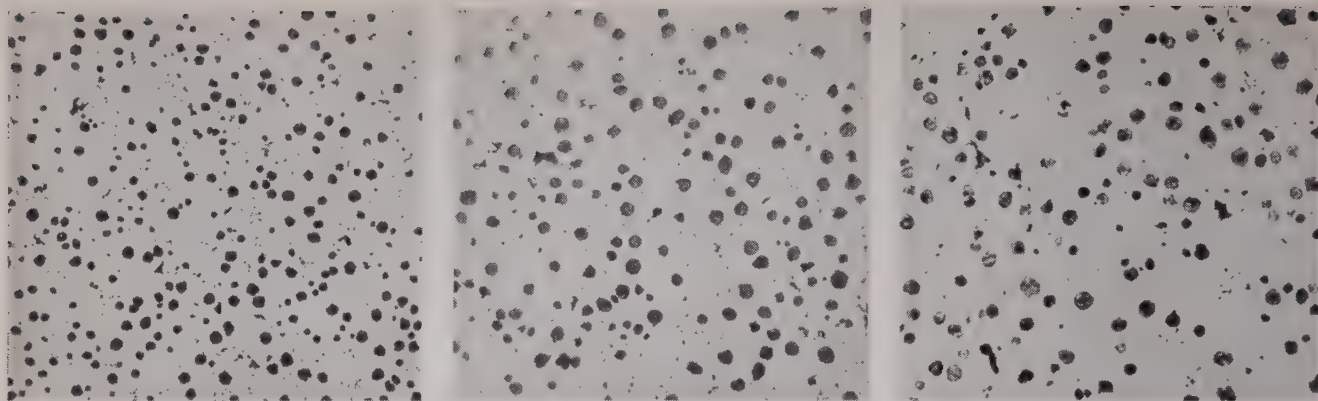


FIG. 11—Graphite structures in the central area of various section thickness of ductile cast iron. 25X.

crankshafts, pumps, compressors, valves and heavy industrial equipment, such as rolls and rolling mill housings, could readily utilize its high strength and rigidity. Its ductility may provide thermal shock resistance far greater than has been available in high carbon castings heretofore and suggests that superior performance might be obtained in items such as railroad car wheels and ingot molds. The superior resistance to growth

and oxidation will assure its use in many engine, furnace and other parts used at elevated temperatures.

Other products include pipe, textile machinery, electrical machinery, paper machinery and marine equipment. Service data will gradually accumulate to determine the improved quality, weight reduction and economy available in specific applications.

... NEW BOOKS ...

"Handbook of Plastics," by H. R. Simonds, A. J. Weith and M. H. Bigelow. Second edition of this encyclopedia of the plastics industry covers plastics of all compositions and all manufacturers, with information on the specific properties which determine applications and methods of processing. Production details, including information on the machinery used, are described for all operations from raw materials to finished products. D. Van Nostrand Co., Inc., 250 Fourth Ave., New York. \$25.00. 1511 p.

* * *

"Engineering Metals and Their Alloys," by C. H. Samans. Text gives a general background of metallurgy and provides a classification of the engineering metals from an application rather than an alloy viewpoint. Sections are devoted to the production of metals, the theory of alloys, principles of heat-treatment, the shaping and forming of metallic materials, corrosion, alloys requiring high strength and toughness, alloys resistant to wear and abrasion, alloys requiring high strength and toughness, alloys resistant to wear and abrasion, tool materials, bearing alloys and other subjects. MacMillan Co., 60 Fifth Ave., New York. \$7.50. 913 p.

* * *

"Patent Law for the Executive and the Engineer," by H. A. Toulmin, Jr. Information on securing patents and on means of protecting the rights provided is covered in this book. The latest changes in law, based upon decisions of the Supreme Court, are included. Research Press, Inc., 137 N. Perry St., Dayton 2. \$2.95. 220 p.

"Design for Welding." Series of technical reports on welded designs includes 82 papers which were chosen as being representative of advancements in welding design. Cost figures on many of the projects are included. Subjects covered include aircraft, automotive, railroad, watercraft, container, machinery, structural and furniture jobs. J. F. Lincoln Arc Welding Foundation, 12818 Coit Rd., Cleveland 1. \$2.00. 1024 p.

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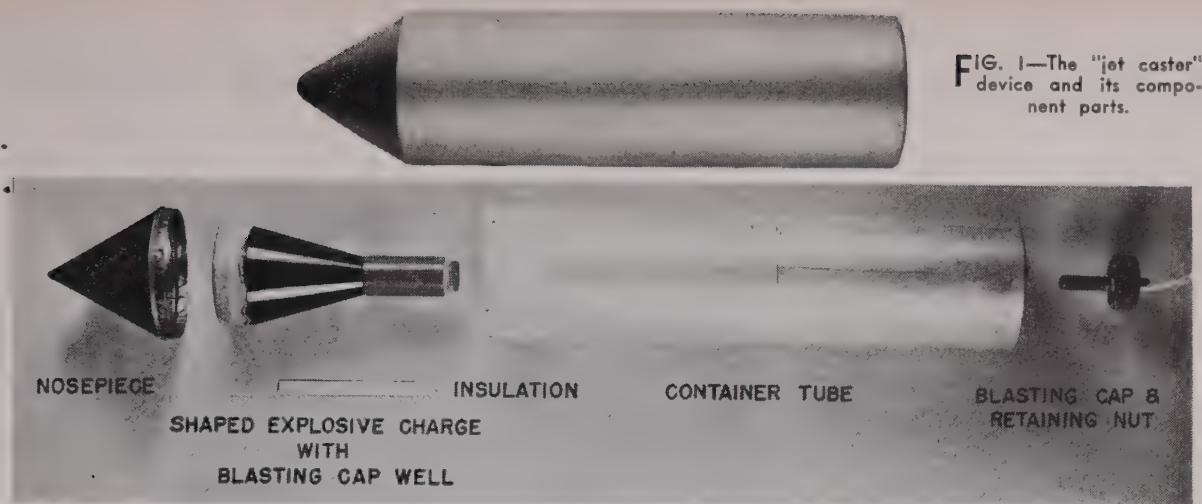
"Statistical Abstract of the United States—1948." The 69th annual edition of this reference volume brings together important summary statistics on population, trade, production, finance and other subjects. It is a selection of the statistics most commonly used by businessmen and others for factual information. Superintendent of Documents, Government Printing Office, Washington 25. \$2.75. 1064 p.

* * *

"How to Keep Invention Records," by H. A. Toulmin, Jr. Book gives instruction on the keeping of records for establishment of patent rights. The material is based upon trial experience in the U. S. Patent Office and in the courts. Research Press, Inc., 137 N. Perry St., Dayton 2. \$2.50. 100 p.

* * *

"Open House in Industry." New edition of manual on industry-community relations outlines practical methods of conducting three types of open house; special guest days for invited groups, family days for families of the employees and community days for which the whole community is invited. National Metal Trades Assn., 122 S. Michigan Ave., Chicago 3. \$1.00. 36 p.



Jet Caster Speeds Tap Hole Opening

A NEW method for opening tap holes in blast furnaces, openhearth and other types of metallurgical furnaces, said to give promise of overcoming the disadvantages of the oxygen lance, was described by B. S. Old, and A. R. Almeida, Arthur D. Little, Inc., Cambridge, Mass., at the Eastern States Blast Furnace and Coke Oven Assn. meeting, held in Pittsburgh recently. The method, which utilizes a "jet caster" unit, has been under experiment at Republic Steel Corp. by E. I. du Pont de Nemours & Co. and Arthur D. Little, Inc., engineers.

The opening of tap holes has always been a somewhat dangerous and uncertain operation. The methods used today have undergone quite an evolution from the old bar and sledge hammer procedure of not so many years ago; nevertheless, the present (almost universal) system of burning out the tap hole with an oxygen lance leaves something to be desired. The major disadvantages are:

(1) Hazard—The individual utilizing the oxygen lance must stand near the path of the molten metal and bad burns sometimes result from fast taps or blowouts.

(2) Lack of control—The lance operator is not able to control accurately the direction in which his lance moves, and long or short or crooked tap holes can result.

(3) Time required—It is often desirable to tap openhearth furnaces at a particular time when the heat analysis is correct, or to cast the blast furnace as soon as ladles arrive. Many times this

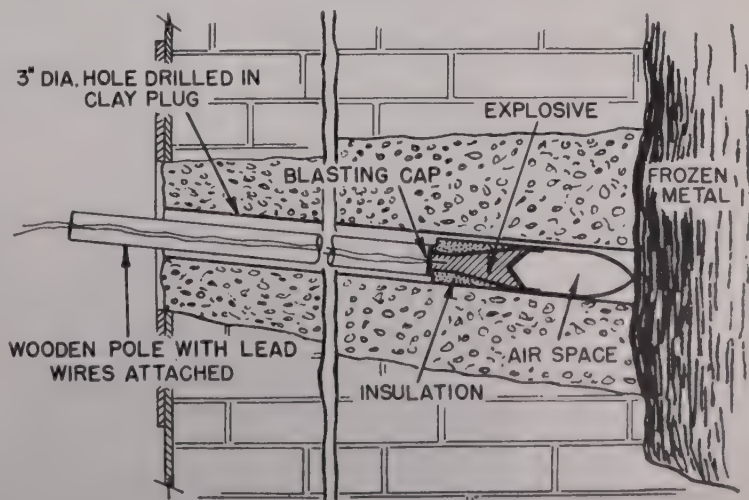
is not possible, especially in the case of the blast furnace, because of delays entailed by the necessity of utilizing several oxygen lances to open the hole. Also, the metal is apt to run slowly at the beginning of the cast.

The device used for tapping the blast furnace is a capsule approximately 10 in. long and 2½ in. in diam, while that for the openhearth is 9 in. long and 3½ in. in diam. Within the capsule is the tap hole-puncturing mechanism, which consists of an insulated cone shaped explosive charge as shown in fig. 1.

The principle of the shaped explosive charge is that it focuses a large percentage of the explosive force forward in a high speed jet of about lead pencil size. In this way small amounts of

(CONTINUED ON PAGE 162)

FIG. 2—Schematic sketch showing position of jet caster in a blast furnace iron notch.



Heating For Hardening and

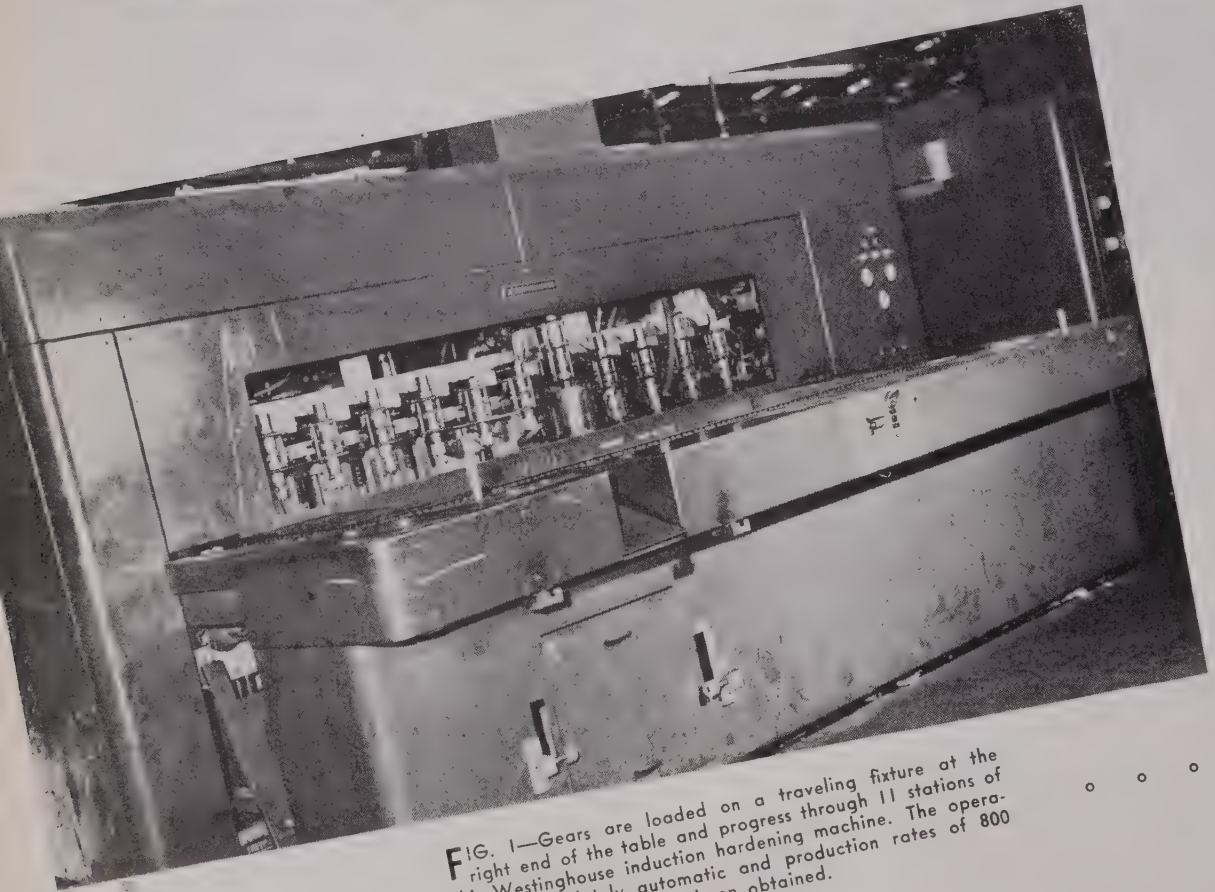
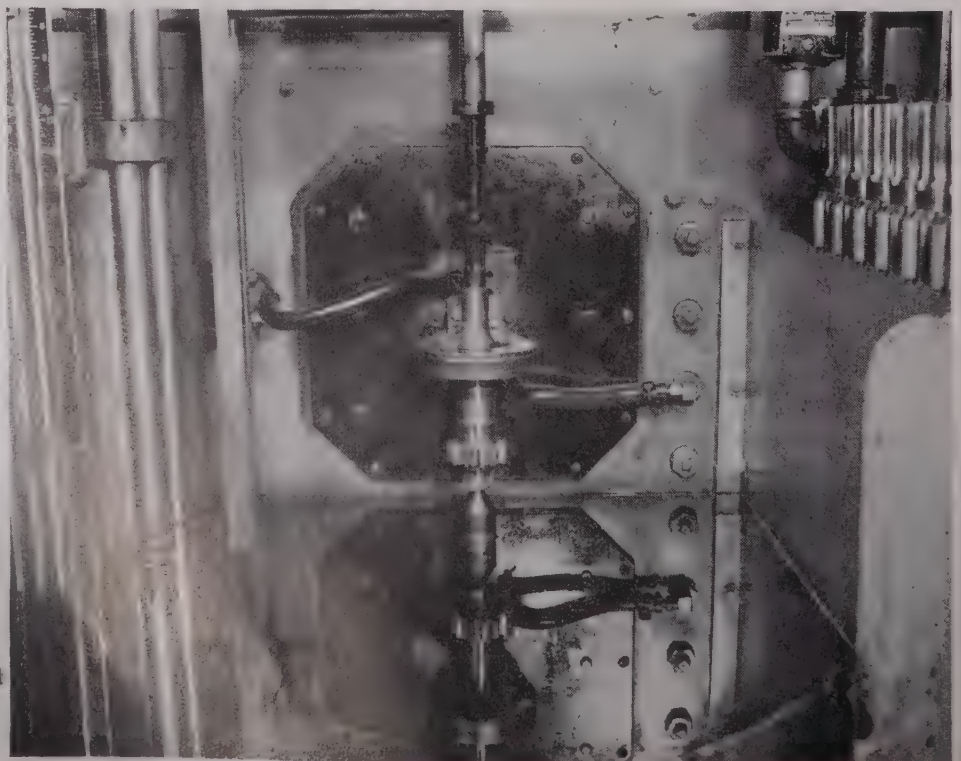


FIG. 1—Gears are loaded on a traveling fixture at the right end of the table and progress through 11 stations of this Westinghouse induction hardening machine. The operation is completely automatic and production rates of 800 per hr have been obtained.

FIG. 2—Versatility of fixture design is evident throughout the heat treating department. This fixture holds the gear in the inductor coil until it reaches hardening temperature, then, as shown, moves it down into the oil quench. A submerged high pressure oil spray speeds the quenching.



Forging With RF Equipment

By THOMAS E. LLOYD

Machinery Editor,
THE IRON AGE

Economies resulting from the use of induction heating for heating forging billets and for heat treating of parts for 100,000 tractors a year at the Louisville plant of International Harvester Co., are evaluated in this article. Details on the use of each RF unit and some of the reasons for the adoption of this method in this modern plant are discussed.

FORGING and heat treating of parts used in the production of 100,000 tractors a year has been greatly facilitated by the use of induction heating. RF heating is used exclusively at International Harvester Co., Louisville, Ky., for heating billet and bar material to forging temperatures and in heat treating gears, pinions, splines, cylindrical surfaces and other shapes and sections required in tractor production.

In operation less than two years, this plant builds three models of tractors, and the high production rate that has been achieved is the result of careful study of high production processes and their adaptability to the plant operations. Outstanding among the processes in use are heat treating and forging stock heating by induction methods and the use of presses and upsetters for all forging.

The plant now uses about 6000 kw in high frequency power, ranging from 60 to 450,000 cycles. Included in the heat treating equipment are Westinghouse, Tocco and Ecco units, while Tocco and Ecco equipment is used for brazing and shrink fitting. Tocco equipment is also used for heating billets and bars to forging temperature.

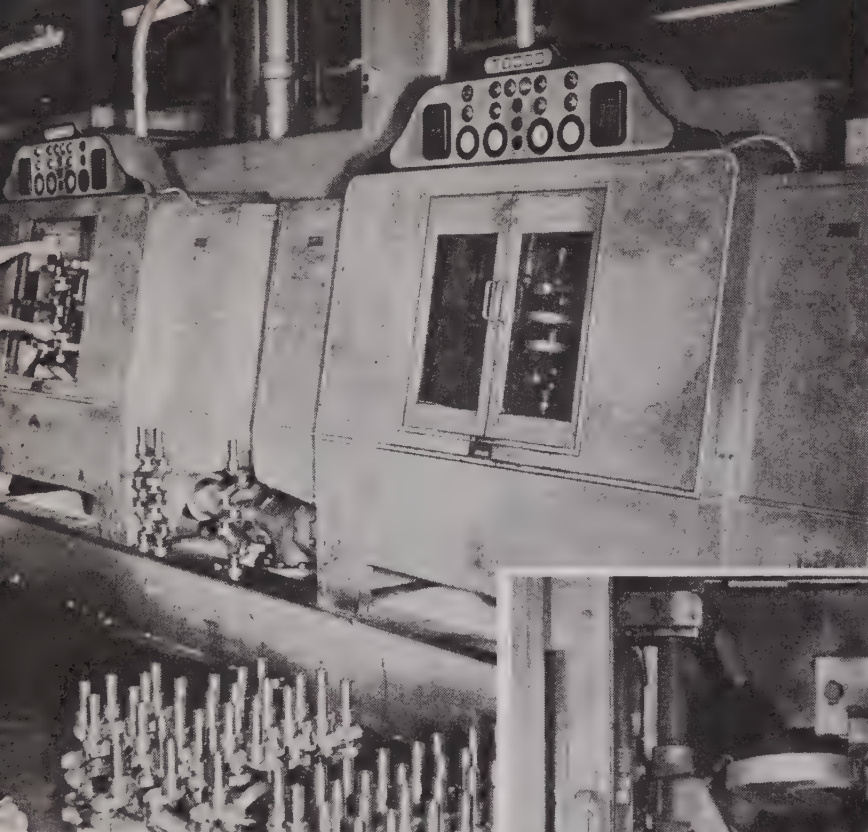
Induction hardening techniques vary greatly, depending upon the work to be done, with a

total of 1560 kw power varying from 60 cycles for preheating to 450,000 cycles for heating to hardening temperatures. Choice of frequency, power, quench, hardness pattern, etc., is extremely important in the application of induction heat and experience is essential. The heat treating at Louisville is roughly grouped into seven classifications.

(1) Heavy gears: In hardening gears of 6 pitch or heavier, the parts are preheated with 60 cycles to about 700°F and then heated to hardening temperatures with 9600 cycles. The quench is a high pressure submerged oil spray. The pressures of the submerged spray range from 40 to 90 psi.

(2) Light gears: In hardening spur gears 7 pitch and lighter, the parts are preheated to about 1000°F with 9600 cycles. The teeth are then heated to hardening temperature with a very short application of 250,000 cycle power. The heating time in this phase of the operation is a maximum of 0.8 sec. After quenching in a water spray, the gears are reheated to 350°F with 9600 cycle power. This achieves a semi-contour hardening with the core hardness extending approximately up to the pitch line, and is used principally in the hardening of transmission gears.

(3) Spiral or helical gears: These gears are heated to hardening temperature with 9600



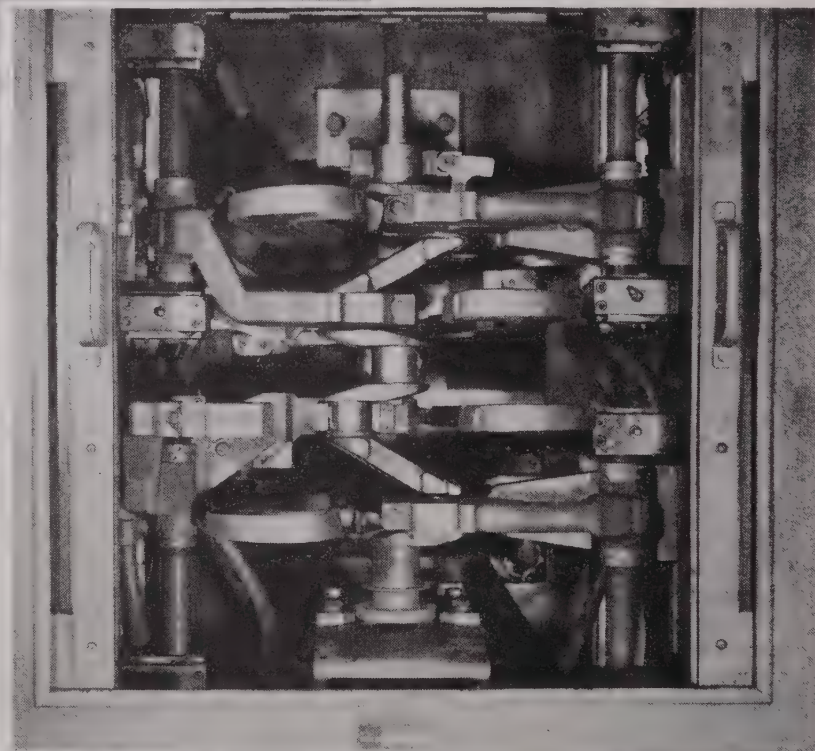
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FIG. 3—The Tocco 9600 cycle machines shown here are for hardening pin and main bearings of crankshafts. The main bearings are hardened in the machine in the background and the pin bearings in the machine in the foreground.

o o o

BELOW

FIG. 4—The fixtures used in the machine illustrated in fig. 3 are shown here. Air locks hold the split inductor blocks in place during the hardening cycle. The quenching medium is a water spray.



cycle power, quenched in high pressure submerged oil spray.

(4) Cylindrical surfaces (crankshafts, etc.): The parts are heated with 9600 cycles to hardening temperature, and water spray quenched. The parts are heated either in stationary position, with the quench spray through the inductor; or progressively, with the work fed through the heating coil into the spray quench.

(5) Small sections or odd shapes: Such parts are heated with 450,000 cycle power to hardening temperature and water quenched. This category applies to very small gears, small wear surfaces, bearings on thin cylinders, or small diameter shafts, and the technique gives a relatively thin hardened area.

(6) Splines: In hardening splines for wear only, they are heated with 9600 cycles in both static and scanning type fixtures and quenched in a high pressure oil spray.

In most cases the generating equipment is separate from the heating stations. These high frequency generators are located in a balcony above the induction department.

For induction hardening, the equipment used is made by Westinghouse and Tocco. The work done on the equipment varies according to shop demands, with a variety of parts being hardened through the use of different work holding fixtures. One of the interesting installations is a Westinghouse unit with 11 individual

stations. This machine, shown in fig. 1, is used for hardening 20 different gears and is completely automatic. Gears are loaded into moving fixtures on a table in front of the machine and progress through the various stations automatically as the machine is timed to the heating cycle.

Four stations are used to preheat the work to 900° to 950°F, through the 150 kw, 9600 cycle phase of the machine. The fifth station heats the gears to hardening temperature, 1700°F, through the 200 kw, 250,000 cycle phase of the machine. At this station the part is water spray quenched through outlets below the inductor coil. The sixth station is a secondary quench, the seventh is an air-blowoff station, and the final four stations are drawing stations. At present only the first five stations are being used, but full advantage of the possibilities of the machine will be taken as soon

as operational and metallurgical details are worked out.

The gears, when they enter the first preheat station, are rotated by the fixtures to assure even heat distribution throughout the area to be hardened. In the hardening station, the fixture advances the part upward into the induction coil for heating and drops it into a spray coil for quenching. Production of the machine is about 800 gears per hr and the work is handled by two operators, one for loading and the other for unloading the parts.

A 50 kw Westinghouse machine operating at 450,000 cycles and equipped with a horizontal scanning fixture is used for hardening various shaft-like parts. Three 20 kw, 450,000 cycle machines with vertical scanners are used for miscellaneous small jobs such as short shafts and other parts that must be selectively hardened.

There are two 200 kw, 250,000 cycle Westinghouse oscillators with rotary, four-station fixtures used for hardening small gears. These have an AF preheating station, in which the gears are brought up to 900° to 1000°F and an RF station for heating to the hardening temperature.

Two six station Tocco units are used for hardening various geared shafts and other parts. These are 9600 cycle, 150 kw oscillators with vertical fixtures. The parts, after being heated to hardening temperatures, are quenched in two ways. One fixture brings the part down

into an oil bath under the induction coil and, while submerged, are subjected to a 90 psi oil spray, as shown in fig. 2. The other quench method is to spray or flood the part with oil through slot outlets in the inductor coil.

A 20 kw, 450,000 cycle Westinghouse unit is used to harden ball ends of a hook-like part. The parts are loaded into a fixture, heated and water quenched. Steering worms and rear axles are hardened in a two station, 9600 cycle, 150 kw Tocco unit. A vertical scanning fixture is used on this equipment and the parts are quenched in oil.

Three types of differential and bull gears are hardened in a three station Tocco 150 kw, 9600 cycle machine. This setup can handle these gears in a single station or in a combination of stations. In hardening the larger gears, two Ecco units are used for AF (60 cycle) preheating.

Another interesting installation is the double-station 150 kw, 9600 cycle Tocco hardening machines for handling crankshaft pin and main bearings areas. Two such machines are used. Seven bearing areas are hardened successively by automatic control, the main bearings at one station and the pin bearings at the other. Fig. 3 shows one of these installations. The crankshafts are positioned manually in the fixture and air locks hold the split inductor blocks in place during the machine cycle, as shown in fig. 4. The quench is a water spray.

Among the other pieces of induction heating equipment are four 60 cycle Ecco units for heating fly-wheel ring gears and bull gears for shrink fits; four 20 kw, 9600 cycle Tocco units for brazing hydraulic lift pistons, manifold tubes, carbide tool tips, and miscellaneous brazing jobs; a 20 kw, 9600 Tocco unit for heating rods for bending and flattening and two 150 kw, 9600 cycle Tocco units for progressively hardening various centerless shafts and pins.

All production brazing and soldering is done with induction heat because it has been found to produce uniformity of heating, and localized and rigid heating. For shrink fits, ring gears are heated at 60 cycles, using a movable split transformer core and using the gear to be heated as the short-circuited secondary of the transformer.

The principal economies in the use of induction hardening at the International Harvester plant at Louisville lie in the use of carbon steels instead of alloy steels to get the necessary physical characteristics. Also, many ma-

FIG. 5—Continuous billet heaters are used for heating billets to forging temperatures. The operator is shown here at the rear end of the heater loading the billets into a chute that delivers them through the heater to the forging press.





FIG. 6—Bar heaters such as shown here are also used for heating. These four bar heaters provide a steady flow of hot stock to the forging press used to produce crankshafts.

chining operations can be eliminated because there is not the extent of distortion present in parts hardened by this method. In many cases the heat treating costs are lower and quality is improved as a result of the lack of distortion and better stress distribution.

While there are the foregoing advantages in the use of induction heating for heat treating, an installation of such size and capacity requires specialized maintenance and rigid metallurgical control. Many applications involve the use of steels in the higher carbon ranges, necessitating careful attention to machining methods and in some cases a marked reduction in tool life and production.

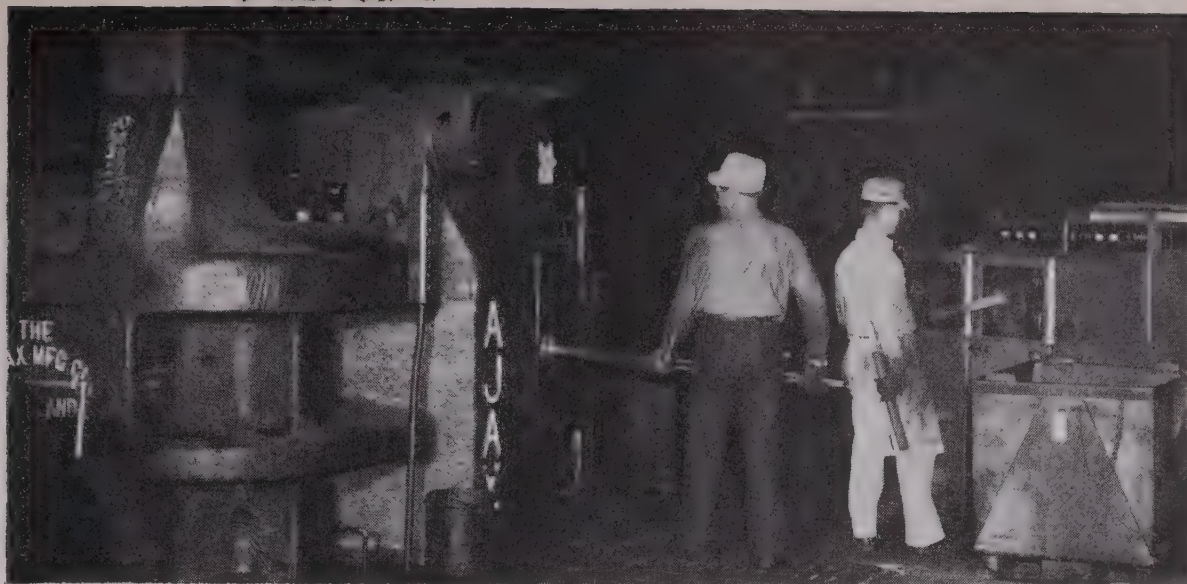
The other major use of induction heating is in the forge shop of the plant. The forge shop consists of four upsetters, five presses and two bulldozers, and each press and upsetter is served by induction heaters. Heating capacity of the 15 units in the shop is about 16,000 lb of steel per hr, ranging in section from 1-in. round to 4½-in. square. The steel is heated either in continuous billet heaters in which sheared lengths push each other through the induction coil, as shown in fig. 5, or in bar heaters, in which one part of a bar is heated to a specified length, as shown in fig. 6. In larger sizes, the heating tends toward the surface, but the temperature is equalized during the transfer of the heated steel from the heating unit to the forging machine.

Power for these heaters is supplied by three hydrogen cooled, 3000 cycle generators, each of 1250 kw capacity, and four water cooled, 9600 cycle generators, each of 150 kw capacity. The upsetters all use 3000 cycle Budd bar heaters, while four of the presses use continuous type billet heaters and one uses bar heaters. The diameters of work heated in the units can be varied by the substitution of various sized coils. Two more heaters will be added shortly for heating of parts to be formed in the two bulldozer presses. At present the parts are heated

in gas-fired furnaces. The heaters for the bulldozers will be 9600 cycle units.

In an analysis of the cost of induction heating by Harvester plant engineers, original investment, operating cost, quality of work, production and working conditions, intangibles and uniformity of temperature were all considered. Through the use of this method of heating material for forging, scale was practically eliminated, thus giving better die wear and permitting press setups designed for long production runs. While power for the heaters is twice the cost of oil, oil-fired furnaces need considerable auxiliary equipment such as descalers, fans, pumps, heaters, storage tanks, and refractory inventories. In addition to prolonged die life resulting from the elimination of scale, there were also the benefits of reduced forging cleaning costs, closer forging tolerances, automatic control of forging temperatures, the elimination of burning and cold forging. Furthermore, greater personal comfort to the operators was evident in better yield. Consequently, while the initial investment favored oil-fired furnace heating, the savings in operating costs and labor and the better working conditions were felt to justify the installation of the induction type equipment.

The forging equipment in the plant is made up entirely of upsetters and presses. This equipment consists of: two National upsetters, 2 in. and 3 in.; two Ajax upsetters, 4 in. and 6 in., and five presses. The presses include a 1000 ton, 10C; a 1600 ton, 16C, and two 2500 ton, 25C Ajax presses, and one No. 7½ 4000 ton National Maxipres. Adjacent to each major forming press a Bliss-Toledo combination trimming and piercing die is stationed, in which the forging flash is trimmed and any holes required in the part, such as gear hub holes, are punched simultaneously. While this practice is becoming more generally used, it is believed that this is the only plant in the country in which such equipment is used exclusively.



F G. 7—This 6-in. Ajax upsetter, served by two bar heaters, is used to forge large flanged axle shafts. In the operation shown, six die openings are required to form the part that the operator is removing from the machine.

The 2 in. National upsetter, serviced by one bar heater, has a die opening $3\frac{1}{2}$ in. and a ram travel after the gripper dies are closed of 6 in. This unit is used in the production of smaller bar type parts such as steering worm shafts. The 3 in. National upsetter, serviced by two bar heaters, has a 5 in. die opening and a $7\frac{1}{2}$ in. ram travel. This machine makes differential and counter shafts with bevel pinions from stock up to $1\frac{1}{4}$ in. diam. The 4 in. upsetter has a 6 in. die opening and a ram travel of 9 in., and is served by two bar type heaters. It is used in conjunction with the 2500 ton Ajax for upsetting the flywheel flange on one end of the crankshaft and for making large differential shafts. The 6 in. Ajax upsetter, shown in fig. 7, has an 8 in. die opening and an 11 in. ram travel after the gripper dies are closed. It is served by two bar heaters and forms large flanged axle shafts.

The 1000 ton Ajax press forges 15 different parts, including small gear blanks, clutch levers, and rod ball ends, using blanks up to 5 in. diam. One continuous induction heater supplies the hot blanks and one trimming and piercing press handles the flash trimming and any piercing operations required. Production averages about 400 pieces per hr in this three die press.

Gear blanks and larger parts are produced at a rate of about 300 per hr on the 1600 ton Ajax. It is also served by a continuous billet heater and a trimming and piercing press, and will handle up to an 8 in. diam blank.

One of the 25C Ajax presses is used to forge several types of transmission gear blanks, steering knuckle arms, differential gear blanks and front axles. Average production of this machine is about 180 parts per hr, and it is served by a continuous billet heater and a trimming and piercing press.

The $7\frac{1}{2}$ Maxipres will handle gear blanks up to 15 in. diam and is used in the production

of larger gear blanks such as blanks for bull gears and differential drive gears. Production runs about 140 pieces an hr, and the stock is heated in a continuous billet heater. For bull gear blanks, the forging billets are about $4\frac{1}{2} \times 4\frac{1}{2} \times 5$ in. in section, and in three forming operations a gear blank about 14 in. diam is formed. Two adjacent presses are used in conjunction with the Maxipres, one for trimming the flash around the periphery of the blank and piercing the center hub hole and five other holes in the web of the blank. The other press is mainly a coining press for restriking the blank. These presses are shown in fig. 8.

The second 25C Ajax is used to forge crankshafts and connecting rods, producing about 265 crankshafts or 675 connecting rods an hr for the three tractor models. It is served by four bar type induction heaters, as shown in fig. 6, a trimming press, and the 4 in. upsetter. The upsetter is used to form the flywheel flange on one end of the crankshaft.

All forging presses are equipped with large bolsters or die sets to withstand the heavy pressures and to provide inserts for holding the dies. The presses and upsetters each have a set stroke or cycle, which makes necessary the design of a die impression to allow the steel to forge and fill the die without waste. The presses require up to four strokes to finish a part, and the upsetters also require up to 4 strokes. Crankshaft dies, for example, consist of three impressions. The bender bends the heated billet immediately after it is taken from the heater. The blocker shapes the stock into the general contour of the crankshaft. The finisher completes the forge forming, distributing all excess metal to the parting line in the form of flash.

While a direct comparison of this equipment with steam forging hammers or board type hammers is practically impossible, some general idea of their relative capacities were de-

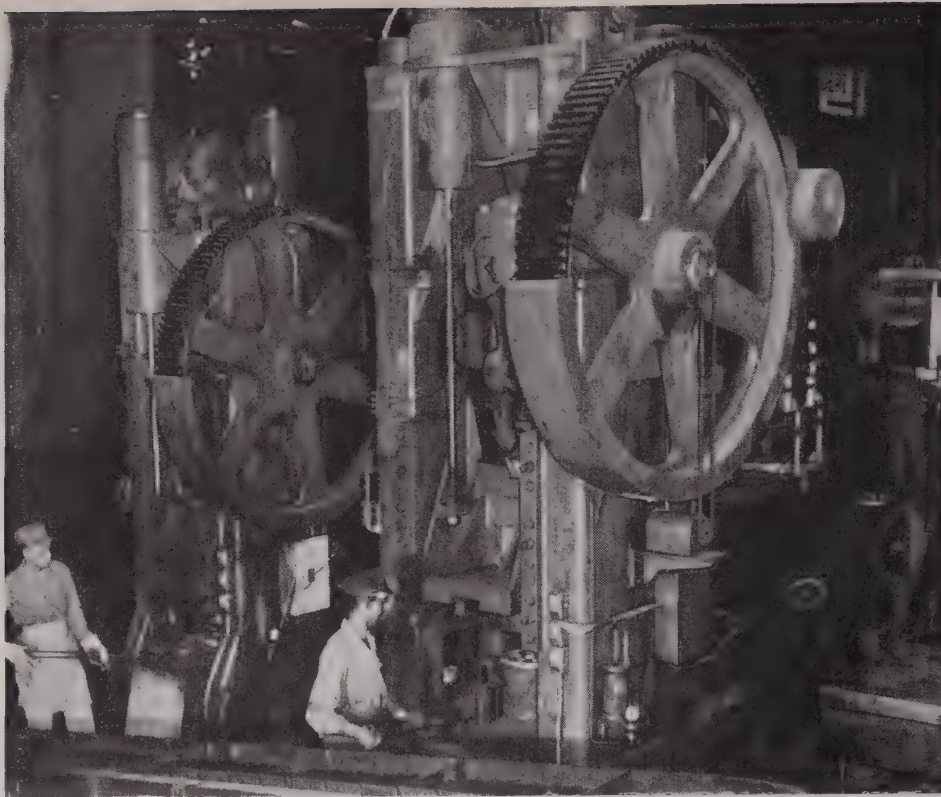


FIG. 8—Combination Bliss-Toledo trimming and piercing presses are used to trim off forging flash and pierce any required holes in the forging simultaneously. The arrangement shown here is used with the National Maxipres. The press at left trims the gear blank and punches the hub hole and six holes in the web. The press at right is a coining press for restriking the part.

veloped by International Harvester engineers. From the standpoint of the work that is handled on each of the presses, they compare with these other types of equipment as follows:

Press Installation	Comparable Steam Hammer	Comparable Board Hammer
1000 ton Ajax	2000 lb	2500 lb
1600 ton Ajax	3000 lb	4000 lb
2500 ton Ajax	5000 lb	7000 lb
4000 ton Maxipres	8000 lb	10,000 lb

Dies for the forging presses, upsetters and trimming and piercing presses are made in the die shop, which is responsible to the forge shop. The die blocks in the upsetters are made of FX-2 die steel and the inserts of Halcomb

218 die steel. Punches are of FX-2, and where wear is a problem IH-82 die steel is used.

In the presses, the die inserts are made of Duprodi. After the impression wears, it is replaced with an insert of Halcomb 218. In the trimming and piercing dies, the ring and base material is made of SAE 4140 and the edges and punches are hard faced with Stellite. This permits almost unlimited use of these dies, because as the edges wear they can be refaced. The facing is applied from rod material by acetylene torch. No trimmers are made of tool steel except those used for cold trimming, and this work is not done in the forging department. Because of the ease with which such dies can be rebuilt and resharpened, maintenance cost is low.

Heliwelding Used As Repair Tool

INERT-GAS, shielded-arc welding is usually considered to be a production tool, but recently has branched out into the field of repair and maintenance.

A repair job that utilized the advantages of this process and could not have been accomplished without it was the replacement of a bottom on an aluminum chemical storage tank. This tank, used by the Cannon Mfg. Co., for the storage of peroxide, had developed serious leaks. Cannon wanted to eliminate the leakage without replacing the aluminum tank.

Heliwelding, an Air Reduction Sales Co. process, was recommended and a welding procedure for the job was worked out.

Using a weaving technique, only one pass was made, which gave complete penetration and a

slight reinforcement from the outside. One finishing bead was made on the inside. Using a single Heliweld holder, the outside weld was made at an approximate speed of 4 ipm. Inside welding was completed in 1½ hr. With the exception of cutting off the defective tank bottom, the complete job of assembling and welding was done in approximately 15 hr. In order to permit the operators to work in the vertical or down-hand position, the tank was placed horizontally and set up on rollers. A rope sling was used to rotate the tank as required.

Obviously, the initial cost of a Heliweld outfit precludes its exclusive use as a maintenance tool. However, if the equipment is part of a plant's production equipment, its possible use in maintenance and repair work is to be considered.

An Analysis of Nitriding

Having considered surface hardness phenomena, associated with the nitriding of some commonly used steels and nitriding grades, in part I of this two-part article, the author discusses a number of other steels including the austenitic stainless types, and analyzes the general considerations and operations involved, in this concluding part of the article. Nitriding equipment, proper applications of the process, precautions to be observed and economic aspects are among the factors also covered.

By HOWARD E. BOYER

*Chief Metallurgist,
American Bosch Corp.,
Springfield, Mass.*

ASIDE from the steels considered in the first part of this article, there are several other steels, including additional types of Nitralloy, which may be nitrided with excellent results.

One such steel, which has been nitrided with considerable success, even though it does not contain any aluminum, is an alloy containing about 0.22 pct C, 0.50 pct Mn, 5.00 pct Cr and 0.50 pct Mo. This alloy, when heat treated for the desired core properties and subsequently nitrided, will show case properties quite similar to those obtained by the use of a steel such as type I, discussed in the first part of this article. Maximum hardness values, when employing the same nitriding cycle, are about the same and the case shows uniform dispersion. Thus patterns of the depth-hardness curves are similar.

Whether or not this alloy offers any particular advantages compared to type I depends upon the specific application.

It is also possible to employ other alloys which will give either higher or unusual physical properties. One example of such an alloy is the type known as Nitralloy N. This steel is similar in composition to type I except that it contains approximately 3.50 pct Ni. French and Homerberg reported as early as 1932 on the effects of nickel in nitriding steels.³ Even though nickel does not combine with nitrogen like many other alloys it

does not impair, to any marked degree, the combination with other elements. It has been the author's experience that the case hardness is slightly lower on the Nitralloy N, as compared to type I, and that a slightly longer time period was required to effect the same case depth with the N type, all other conditions being equal. The difference in hardness was not usually more than one to two points on the Rockwell 15N scale.

The primary reason for the use of such a steel as Nitralloy N is for the potential core properties. The addition of nickel imparts age-hardening properties to the alloy which are useful where extremely high core properties are desirable. For example, this steel can be heat treated by austenitizing, quenching and tempering to a machineable hardness range either in the bar form or after the rough machining operations. After heat treatment, the finish machining operations and nitriding are performed. During the nitriding operation the core of the material, which for most steels remains unaffected during nitriding, hardens by dispersion (age or precipitation-hardening) to a marked degree. The amount of dispersion hardening which will take place depends on several factors although it has been the author's experience that parts made of Nitralloy N and heat treated to about 240 Bhn would usually show values of 350 to 400 Bhn in the core after a 36-hr nitriding cycle. Such an alloy can meet requirements which would be difficult or impossible with ordinary nitriding or commercial alloys.

It is only logical to expect that Nitralloy N would be more difficult to machine than a steel such as type I, and as a result it is not economical

In the first part of this article, THE IRON AGE, February 10, p. 68, surface hardnesses obtained by nitriding various commonly-used steels were reported by the author and depth-hardness data, providing a nitriding efficacy comparison of the steels with Nitralloy G Modified, were discussed.

to use such an alloy unless full advantage can be taken of the high physical properties.

This phase of the discussion would certainly not be complete without some mention of the developments with free-machining grades of Nitalloy. For a number of years either sulfur or selenium, usually the latter, have been used extensively as an aid to machinability. This feature is particularly desirable in materials which are to be subsequently nitrided, since the stock is generally machined in the heat-treated condition. The free-machining additives have been extremely beneficial in promoting faster cutting speeds and increasing tool life, and at the same time have little or no apparent effect on the nitriding action. Impact value, however, is impaired to some degree as would be expected for any steel to which sulfur or selenium have been added.

Another steel, which is a more recent development, is a type of graphitic steel.⁴ The general success of graphitic steels in tool applications has suggested the possibility of employing a composition which would be amenable to nitriding. Since both aluminum and silicon are standard graphitizing elements, it has been no small problem to adjust these two elements in accord with chromium, molybdenum and manganese or the carbide forming elements to achieve the desired microstructure in the heat-treated product. One of the properties to be kept in mind regarding the use of such a material as a graphitic Nitalloy is improved machining characteristics. Another desirable property possessed by a partially graphitized material is the natural lubrication properties and ability to hold an oil film. As yet the use of graphitic Nitalloy has been mostly confined to experimental applications so that its possibilities along some lines are yet to be determined.

The surface hardening of cast iron by nitriding has been known for many years though it never achieved a high degree of popularity. Cast iron of a high quality which has been alloyed with suitable elements, usually chromium, molybdenum and aluminum can be nitrided so that the surface is nearly as hard as nitrided alloy steel. A depth-hardness curve, however, usually shows a relatively shallow case even after a long nitriding cycle. Such results would seem logical, when one considers that most cast materials are relatively nonuniform in structure. When employing forged or rolled steel the author has already stressed the importance of obtaining a still more homogeneous or highly dispersed structure by heat treatment prior to nitriding. Since such a high degree of dispersion could never be obtained in cast iron, it would be illogical to expect the nitrided case to compare in quality with that of a nitrided alloy steel. Nitrided cast iron has, nevertheless, filled some engineering requirements where only abrasive wear and no impact is involved.

Nitriding Austenitic Steels

One class of steels which has not, as yet, been discussed in reference to nitriding is the austenitic type. A number of investigators in this country and abroad, especially in England, have

focussed a great deal of attention upon the surface hardening of these steels. One of the original applications for which the process was developed was that of surface hardening the stems of exhaust valves for aircraft engines.

It is easy to understand that the scope of engineering applications for austenitic steels, inherently resistant to heat and corrosion, can be greatly extended with the addition of hard sur-

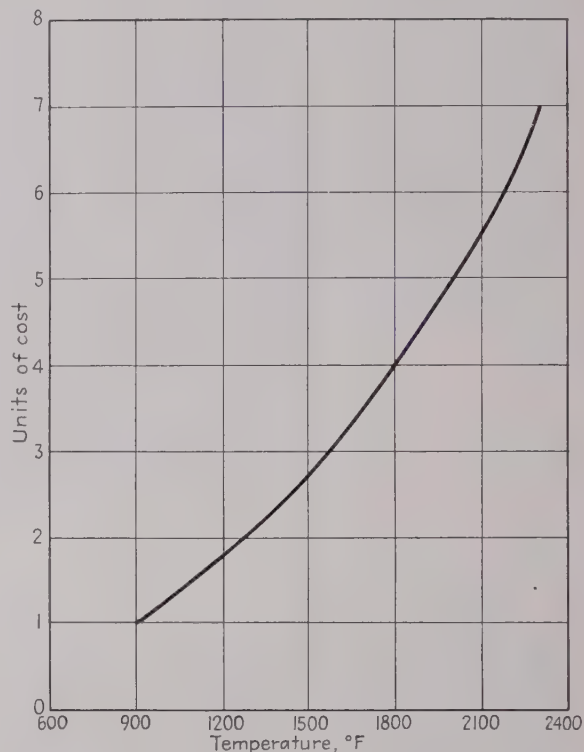


FIG. 17—Furnace operation cost as a function of operating temperature.

faces. Several types of austenitic steels are being successfully nitrided and employed for a number of industrial applications at the present time. This process is, however, subject to definite limitations which must be carefully kept in mind by those contemplating its application.

Since the principal interest in recent years for surface hardening austenitic steels has been centered around the high chrome-nickel compositions such as 18-8, 19-9 and similar compositions, this discussion will be confined to steels of this type.

Some of the reasons for stating that the use of the process is necessarily limited are: (1) The case is extremely thin and susceptible to chipping and spalling, (2) the corrosion resistance of the material is decreased to a marked degree, (3) modifications to the normal nitriding process must be made for successfully nitriding steels of the austenitic type and (4) some compositions of this class are susceptible to grain boundary carbide precipitation and subsequent intergranular cracking when exposed for long periods of time to the temperature range employed for nitriding. There are, however, many engineering applications to which the nitriding of austenitic materials can be advantageously applied if its limitations are carefully taken into account.

The total case depth on 18-8 stainless is rarely deeper than 0.005 in. Reasonably uniform hardness values of 92 to 94 R15N can be obtained on the surface, though this value decreases rapidly with the removal of only 0.001 to 0.002 in. It must be remembered, therefore, that no finishing operations with the possible exception of fine lapping or polishing can be performed after nitriding if the hardness is to be fully preserved. The line of demarcation between case and core is extremely sharp; similar to that for steels types 6 and 7 (figs. 8 and 9 of the first part of this article). It follows that a structure of this type will be extremely susceptible to chipping and spalling, and it would be logical to expect the corrosion resistance to decrease since a portion of the chromium in the surface layers is consumed in the formation of the nitrides. It would be almost impossible to state the degree to which the corrosion resistance is decreased, for this is entirely dependent upon the media to which the nitrided parts are to be subjected. For some applications the parts may show little or no decrease in corrosion-resisting properties while for others the decrease may be sufficient to render the process prohibitive.

Nitriding Stainless Steel

Stainless steels are resistant to corrosion by token of their oxide film. This film, being chemically inactive, is extremely resistant to the reaction with nitrogen and penetration is necessary before nitriding can begin. There are several methods of accomplishing the oxide breakdown. Pickling or blasting with fine abrasive just prior

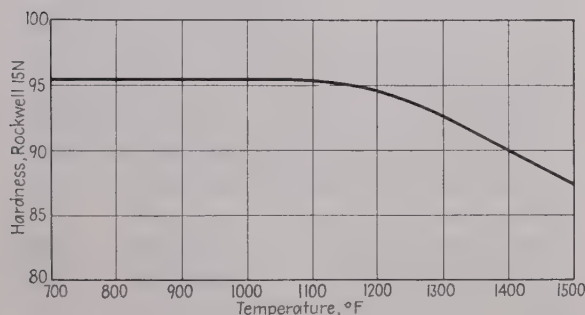


FIG. 18—Decrease in nitrided case hardness after exposure to elevated temperatures.

to loading the parts in the furnace are effective, but are rarely sufficient to permit obtaining uniform results. One of two other methods is usually necessary to effect a sufficient oxide penetration. One of these is to subject the work in the sealed furnace to free hydrogen for reduction of the oxide prior to nitriding. Another method is to completely purge the air from the sealed furnace with ammonia and then increase the temperature to 1150° to 1200°F, retaining a constant flow of ammonia. This higher temperature effects a high degree of ammonia dissociation allowing excess hydrogen to reduce the oxide. After 1 to 2 hr of this reducing operation, the temperature is decreased to the normal nitriding temperature (usually 1000°F for 18-8), the am-

monia dissociation is adjusted to 25 to 30 pct and the cycle is completed in the usual fashion.

Careful selection of steel within the austenitic types is of the utmost importance for consistently good results, as some varieties are not suited to holding for long periods of time in elevated temperature ranges. For example, a steel such as type 303 with a random carbon content is likely to exhibit grain boundary carbide precipitation and subsequent intergranular cracking when exposed for long periods at 1000°F. This type of steel with a maximum of 0.06 pct C can apparently withstand the nitriding cycle without danger. Molybdenum additions also influence the stability of the carbide in austenitic steels. Types such as 347 or 321, which contain small additions of columbium or titanium, are also regarded as being better adapted to withstanding nitriding temperatures.

Nitriding Equipment

Most nitriding installations are batch type furnaces, though many plants employ semicontinuous types and in some cases continuous furnaces are in successful operation. Fig. 17 shows a typical batch type installation. At the upper right is a view of the instrument panel and near the center are shown the pressure reducer, flow-scope and pipette used for controlling the flow and dissociation of the ammonia gas through the furnace. Just above the furnace proper is a form sheet clipped to a board on which all data pertinent to the nitriding cycle in operation are recorded.

The operator records the heat number, type and amount of work in the furnace, time furnace was purged, time temperature was reached and the time the cooling cycle was started. Dissociation readings taken during the cycle are also recorded. The furnace proper is electrically heated and is equipped with an internal fan so that a uniform temperature and gas flow is insured throughout the sealed furnace. This furnace is equipped with a heat exchanger, so that a full charge can be cooled from the nitriding temperature of 960° to 300°F in 1½ hr.

Fig. 18 illustrates an ammonia tank manifold set up to supply several furnaces simultaneously.

One particularly attractive feature of nitriding in general, is the fact that little accessory equipment is required. Quench equipment, cleaning equipment and other miscellaneous pieces of apparatus are unnecessary when nitriding is employed as the means of surface hardening.

Nitriding Costs

There has probably never been any process employed in industry which has presented such a major problem in attempting to obtain accurate cost figures as heat treating. In calculating the cost of any heat-treating operation there are many influencing factors which must be taken into consideration. These factors include the type of the material being processed; type of treatment; design of the parts; cost of materials, including heat treating salts and quenching oils; temperatures involved in the heat treating operations; cleaning operations; and probably the

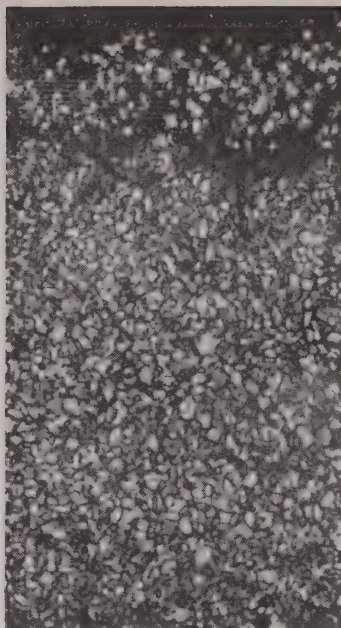


FIG. 19 — Decomposed case of nitrided Nitralloy after 4 hr at 1800° F. 350X.

most important factor of all, the amount of similar parts available for treatment at one time.

In calculating costs one must also consider hidden costs such as straightening or other added operations in finishing which are made necessary from deformation in treatment. To obtain accurate figures on cost it is necessary to have full knowledge of all details and specifications and even then, general figures tend to be inaccurate and misleading. In most cases accurate cost figures can be given for the complete cycle of heat treatment only when applied to a specific part or application. Therefore, a lengthy discussion of cost calculation will not be attempted in this article. However, particular attention to a few important factors which are frequently neglected in the calculation of costs by various surface hardening methods is worthwhile.

One particular factor is relative to the necessary heat-treating temperatures. Studies made of costs of furnace maintenance and power prove that in general the combined cost of these two vary in proportion to the square of the operating temperature. Fig. 17 is a chart which illustrates this condition graphically. On this chart, temperature is plotted on the horizontal axis and units of cost on the vertical axis. From the curve it is seen that if one unit of cost is required to operate a furnace at 900°F for a certain length of time it will require four units of cost to operate at 1800°F for the same time period. This particular factor imparts a decided advantage to the use of nitriding as a means of surface hardening. Further, the maintenance cost on nitriding furnaces is negligible.

Another important factor in considering the cost of various methods of surface hardening is that of cleaning. Parts are brought from the nitriding furnace absolutely clean with an attractive silvery appearance so that no cleaning operations are necessary.

In many cases there are hidden costs which either never appear on the cost sheets at all or which are in the form of operations not charged

to heat treatment but which could be eliminated by a change of method. Examples are straightening or excessive finishing operations which could possibly be eliminated by employing nitriding due to the minimized deformation. This is another factor which gives the nitriding process a distinct advantage.

Nitriding is particularly efficient where large quantities of similar parts, at least a fully-loaded furnace, can be processed at one time, for most nitriding is done in batch type furnaces and the cost of processing is therefore nearly the same for a few parts as for a full charge.

Nitriding is not necessarily the extremely costly process which it was at one time. Whereas most nitriding cycles used to be of 70 to 100 hr duration, the cycle now is usually from 8 to 50 hr, depending upon the case depth desired.

One factor which does have a major influence in increasing the cost of nitriding is the necessity for the material to be heat-treated in some preliminary stage. In most instances, irrespective of the type of material to be nitrided, it is more economical to purchase the steel in the heat-treated condition. If parts are being fabricated from forgings, it is usually found most economical to perform the heat treatment immediately after forging and prior to the machining operations.

Nitriding Applications

Like all other processes, nitriding has a definite role to play in the engineering field and cannot, by any means, cover the whole range of applications for parts requiring hard surfaces. The properties gained by the nitrided case which are superior to those possessed by a cyanide or carburized case are: (1) A higher degree of surface hardness, (2) much greater wear resistance, (3) greater heat resistance, and (4) a higher degree of resistance to corrosion. One of the more attractive features of nitrided work is minimized deformation in comparison to higher temperature heat treatment.

Deformation in heat treatment may be attributed principally to three factors; (1) volumetric changes occurring from phase transformation, (2) unequal temperature changes caused by a rapid quench, and (3) unbalanced residual stresses, resulting from machining or other cold operations, which cause the parts to deform as soon as heat is applied. Volumetric changes in nitriding are negligible. It is true that a slight growth takes place, but there are no phase changes in the temperature range involved. Unequal temperature changes are completely eliminated and the effects of unbalanced residual stresses are lessened because the heat treating temperature is lower, although parts subjected to severe machining operations should be stress relieved by heating whether nitriding or any heat-treating operation is to be employed.

There are some disadvantages imposed by the nitrided case as compared to a carburized case. The principal one is that the nitrided case is extremely brittle and is thus susceptible to chipping and spalling. Therefore it should not be used where impact in operating conditions is

present to any high degree. Most nitrided cases are thin and the core is usually softer than that of a carburized and hardened alloy such as SAE 4620. It follows that nitrided work is more susceptible to brinelling from heavy and concentrated loads.

The high degree of hardness and wear-resisting qualities of nitrided case are well known, but many do not consider the additional properties—notably resistance to heat and corrosion—obtained. The relatively high hardness values possessed by the carburized case begin to decrease rapidly as the temperature is raised for even short periods of time beyond 250°F. This hardness decrease not only prevails while at high temperatures, but remains after returning to room temperature. The nitride case possesses entirely different characteristics. It will withstand temperatures up to 1000°F for almost infinite periods of time without softening, and temperatures even higher than 1000°F may be employed for short periods of time without permanent loss of physical properties. Fig. 18 is a chart showing the hardness decrease for a nitrided aluminum bearing alloy for temperatures up to 1500°F.

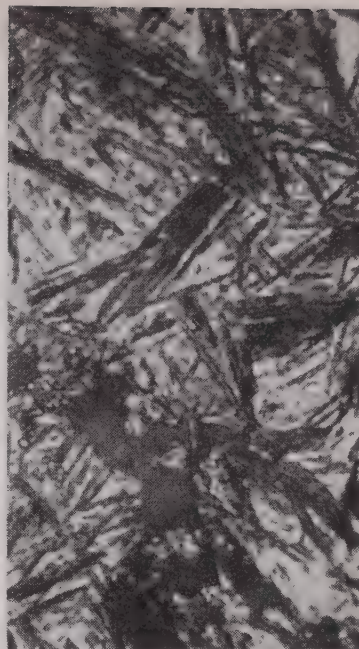
Alloys not containing aluminum are slightly less resistant to the higher temperature ranges due to the fact that aluminum forms a more stable nitride. Unlike the carburized case, the nitrided case does not soften by a tempering action but by complete decomposition of the nitrides. Test pieces used to obtain data for fig. 18 were nitrided at 960°F for 30 hr, then were heated for 4 hr at the temperatures indicated and again tested at room temperature. Complete decomposition of the nitride case does not take place until a temperature of approximately 1800°F is reached.

Fig. 19 shows a photomicrograph of a case which has been decomposed by heating at 1800°F. Edge of the case is shown at the top of the picture. Fig. 20 is a photomicrograph of the core section from the same test piece. The coarse structure is the result of heating for a long period and air cooling. The coarse martensitic needles are formed from enlarged austenitic grains.

Another attractive feature of the nitrided case is the relatively high degree of corrosion resistance as compared to a carburized case. While nitrided work cannot be classified with stainless steel it is usually found to be highly resistant to the action of crude oils, many alkalies, fresh water, atmospheric conditions and still sea water.

One newer method which has been employed to improve the corrosion resistance of nitrided work is to purposely form a thin film of oxide on the work. This is accomplished during cooling at the end of the nitriding cycle. Instead of cooling the charge with the protection of ammonia gas to 300°F and then opening the furnace or work container, the ammonia is shut off at approximately 550°F and dry air is forced through the charge. Another method is to simply open the work container at 550°F, allowing the work to cool in air. This technique imparts an attractive bluish finish to the work and has been found quite useful for increasing corrosion resistance in specific applications.

FIG. 20 — Core of the test piece in fig. 19 after exposure to 1800°F. 350X.



Precautions

Nitriding is regarded by those who are thoroughly familiar with the process as being one of the simplest of all heat treating operations. By the use of good equipment kept in first class order and adherence to a set routine of operations, there is no reason for work spoilage. Highly skilled operators are not required.

Care and control must be exercised if desirable results are to be consistently obtained. This control must start with the raw material. The correct microstructure, as previously described, must first be obtained either by purchasing or heat treating the rough machined parts. At least 0.020 in. of stock must be removed from important surfaces between the heat treatment and the nitriding operations to insure the absence of surface decarburization. If stress relieving operations are employed to minimize the ultimate deformation, it is necessary to again remove enough stock so that all important surfaces are oxide free. It is necessary that parts be free from dirt and grease prior to loading into the nitriding furnace. Blasting with fine abrasive prior to nitriding is an excellent practice for producing surface conditions amenable to uniform nitriding, and this practice is usually a necessity when nitriding steels such as types 4, 6 and 7.

It is frequently desirable to allow some areas to remain free from nitrided case. In other instances, parts of certain design demand that some portions be protected from the action of the ammonia gas. The protection of threads is, in almost all cases a necessity, as threads tend to nitride completely through near the crest and become extremely brittle and susceptible to chipping. Any prominent projection such as a thread crest or a sharp corner tend to form concentrated nitride or white layer at the extremity, thus accentuating the possibility of chipping or spall-

ing. The photomicrograph in fig. 21 illustrates this condition.

In some instances it is impractical to machine certain portions of a forging or to remove stock between the heat treating and nitriding operations. Even though it may not be necessary that such areas become hard, if decarburized areas are exposed to nitriding gases the surface will be attacked and a flaky, chipped surface will result. Such areas will probably be objectionable from an appearance standpoint, if for no other reason, and should be protected to insure against this condition.

As to the method of protection, there are several which will give satisfactory results. Electrodeposits of tin, nickel or some copper deposits⁵



FIG. 21 — Photomicrograph demonstrates tendency for nitride to build up corners or sharp edges. 250X.

can be employed to insulate against the action of the nitriding gases. It is not necessary to use a heavy plate; 0.001 in. is ample and the author has found that a plate thickness of 0.0004 in. will afford complete protection if the plating is not porous. Tin is the least hazardous in this

³ H. J. French and V. O. Homerberg, "The Role of Nickel in Nitriding Steels," *Trans. ASM*, vol. 20, No. 6 (1932); *THE IRON AGE*, Oct. 6, 1932.

⁴ V. O. Homerberg, "Graphitic Nitralloy," *THE IRON AGE*, Nov. 18, 1948, p. 99.

⁵ W. V. Sternberger and E. R. Fahy, "Copper Plate as a Stopoff When Nitriding," *Metal Progress*, February, 1945.

respect since it is actually molten at the nitriding temperature thus tending to seal a porous condition. One of the best and most positive methods is the use of a tin oxide paint preparation which is marketed for the purpose. Thin coats of this paint, brushed on, provide an excellent stop-off. One must exercise caution in preventing such paint from running to areas not to be stopped off, but if carefully applied it will adhere by capillary attraction.

A method for painting internal threads which

has proved most practical is to have threaded plugs which fit the holes loosely made. The paint is then applied to the plug and when it is screwed into place the threaded section will be thoroughly painted without danger of excess. The stopoff is not accomplished by a mechanical fit, but by a good paint job. The plugs may be made of brass or machine steel and should always be made to fit loosely to facilitate removal after nitriding. It is usually good practice to allow the tin paint to air dry prior to loading though it is not absolutely necessary if parts are loaded with care.

One important factor which must be kept in mind when intricate parts are selectively nitrided is that of unbalanced stresses. Nitriding has the tendency to place the surface layers in a state of compression, which is usually a most desirable condition. Therefore, if a part is partially stopped off, it may warp severely due to the unequal stresses which have been imparted. This may be readily demonstrated by taking a thin strip and stopping off one side only. After the strip is nitrided it will bend to an appreciable degree away from the side which was left unprotected. The effects of unbalanced stresses are greatly lessened in heavier parts and sections.

After parts are loaded and the furnace or container is sealed, the temperature should not be allowed to rise higher than 300°F until the sealed interior has been purged with ammonia and the exhaust gases show less than 10 pct air by volume. After the interior is purged to this point, the ammonia flow should be readjusted to the predetermined rate and the temperature controls set to the desired nitriding temperature. Dissociation readings can be quickly made by the pipette apparatus though it is not often necessary once the flow has been determined. A dissociation of about 25 pct has been found optimum but not extremely critical.

Nitriding temperature is more critical and use of the best temperature control equipment is advisable. Most nitriding is done in the temperature range of 940° to 1000°F. It is true that the reaction may take place slightly faster at the higher side of the range, but this practice tends to build up more of the white layer which is, for most purposes, undesirable. It has been the author's experience that 960°F $\pm$ 10° is the optimum for the materials discussed in this article with the exception of the austenitic steels. For this class, better results are obtained by use of the higher temperature range—1000°, or even 1025°F.

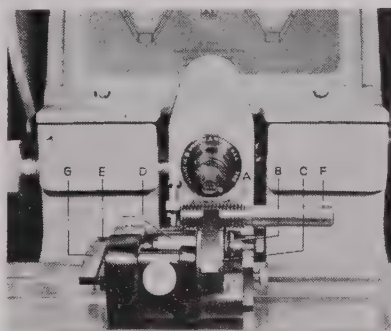
No detailed discussion of the nitriding of high-speed tool steels for cutting purposes has been included in this article, as the advantages as well as the limitations of applying a light nitride case to prolong tool life are generally well established. In general, however, application of light cases for this purpose is done by immersion in a molten salt bath of suitable composition rather than in the nitrogenous atmosphere induced by ammonia gas. While such nitriding can be successfully done in gas atmospheres, control of the light case is simpler with the salt bath method.

New Production Ideas . . .

A horizontal multiple punch, an automatic screw machine, a duplex surface broaching machine, a hydraulic knife grinder, a continuous thread roller, an automatic gaging machine, and a universal screw stage for optical comparators are described this week, together with burnishing barrels, spray painting tanks, an electronic gas filter, automatic burners, and power strapping machines.

A HORIZONTAL multiple punch has been designed for multiple punching the flanges of long, wide sheets, and allows for punch tools to be mounted on varying centers across the ram face. An air clamp device holds the material down during punching and for gaging purposes. Stripping is accomplished by air cylinders that travel with the ram. The frames are of welded steel plate. Clutches are jaw type with motor driven V belt to flywheel. Capacities range from 50 to 300 tons. The following specifications are on the 200-ton model illustrated: Distance between housings, 63 in.; stroke, 6

simultaneously compares all the elements of the thread with a master gage. It checks at a glance the lead for the whole length of engagement of the screw, pitch diameter and thread angle; and the crest, root and taper. The enlarged shadow

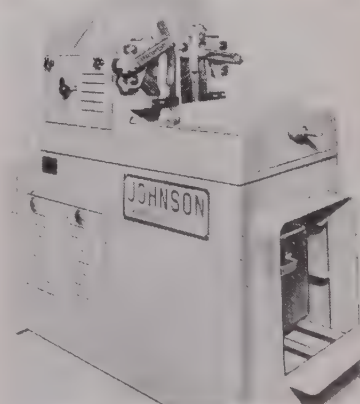


also reveals wear of tools, chasers, rolling dies, or grinding wheels. It detects each individual error and shows cumulative effect. It will measure a wide range of diameters and pitches as well as right or left hand threads. A pair of rolls, corresponding to the pitch of the thread to be inspected, is mounted on the roll shaft. The fixed roll is spaced longitudinally from the center of the lens, a distance equal to the length of engagement of the screw to be inspected. A master gage is then staged on the rolls. It is also supported and held by the adjustable backstop A and the spring operated clamp C. The enlarged shadow of the master thread is then made to coincide with the correct tolerance outline on the chart, thus representing a perfect screw in a perfect nut. The master gage is then replaced by the production screw to be inspected. The shadow of the production screw thread must fall between the maximum and minimum tolerance outlines on the comparator chart to pass inspection. The space between

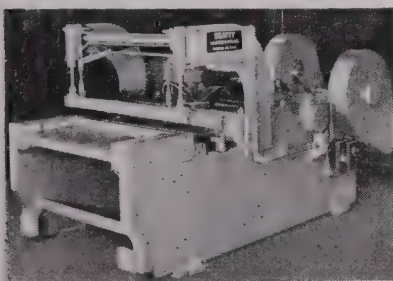
the outlines represent the permissible tolerance for the class of fit required. Lateral displacement of the shadow shows lead error, vertical displacement shows pitch diameter variation. This staging fixture with four pairs of rolls will accommodate any screw of a given form from 3/16 to 1 in. diam, and any pitch from 6 to 44, right or left hand. *Jones & Lamson Machine Co. For more information, check No. 2 on the attached postcard.*

Automatic Screw Machine

RAPID changeover with increased production is an outstanding advantage of a new automatic screw machine. Changeover is a matter of minutes with no cams to change as one set serves for all jobs. A new patented mechanism assures steady stock feeding at



proper tension, eliminating feed fingers. The travel of the forming arm, cut off arm, and stroke of drill spindle are regulated by segment adjustment. The position of studs in the segments or cross slides and drill arm, determines the throw, movement or length of



in.; die space with ram back, 18 1/4 in.; ram width, vertically, 10 3/4 in.; ram length, 72 in.; table width vertically, 9 in.; table length, 72 in.; and throat depth, 5 in. *Beatty Machine & Mfg. Co. For more information, check No. 1 on the attached postcard.*

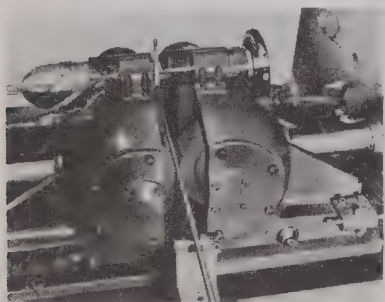
Universal Screw Stage

AS rapid as snap gages, more positive than pitch diameter, lead and form gages, and eliminating the cost and uncertainty of gage wear, the new Universal Screw Stage for J & L optical comparators is an important advancement in gaging technique for screw threads. The Universal Screw Stage is said to provide the only method that

travel of the tools. Cycle operation varies from 1.5 to 60 sec, changed by substitution of cycle gears that are accessible on the front face of the gear box. Spindle speed may be varied by raising or lowering the motor base. Downtime is further reduced by the method of chip and finished product removal that is accomplished without halting operations of the machine. *Johnson Automatic Machine Co. For more information, check No. 3 on the attached postcard.*

Heavy-Duty Thread Roller

A NEW heavy-duty precision thread roller that rolls continuous threads, knurls or serrations has a frame of such weight and sturdiness that it is said to provide for 72 pct higher hydraulically-applied rolling pressures to accommodate materials with higher physical properties, greater diameter and pitch thread sizes, and increased length of work. The machine takes diameters from 0.138

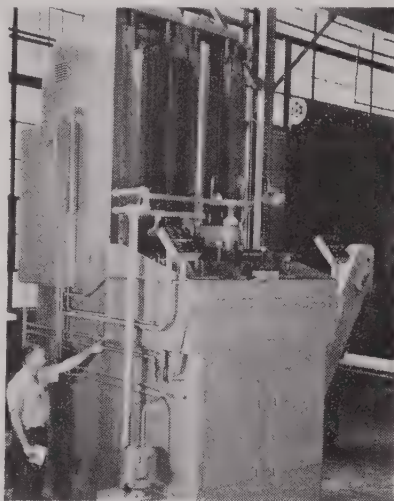


up to 4 in. with a maximum of 8 pitch. Its regular length of thread capacity, when through-rolling is not being used, is 2¼ in. standard, 3¼ in. max. It will handle any material that has an appreciable percentage of elongation. Threads, knurls, or serrations are formed as the blank is rotated between two cylindrical dies of 6½ in. average diam. These large dies provide high surface rolling speeds of 200 to 540 fpm and an average 20.4 in. of useful circumference, which factors combine to provide maximum output and die life. *Watson-Flagg Machine Co. For more information, check No. 4 on the attached postcard.*

Surface Broaching Machine

THE duplex surface broaching machine illustrated has a 40-ton capacity with 72-in. stroke and broaches large diesel bearing sup-

ports. A feature of the tooling design is the automatic cycle of the left hand table and right hand broach arbor, both of which index six times in generating one complete broaching cycle. The left hand station broaches the step



joint faces in the six passes, and the right hand station rough broaches the half round surface in six passes. The part broached weighs over 150 lb and approximately ½ in. of stock is removed on 110 sq in. of surface. Interlocked electrical controls provide continuous machine cycle during the six passes. A chip conveyer handles the scrap accumulated. *American Broach & Machine Co. For more information, check No. 5 on the attached postcard.*

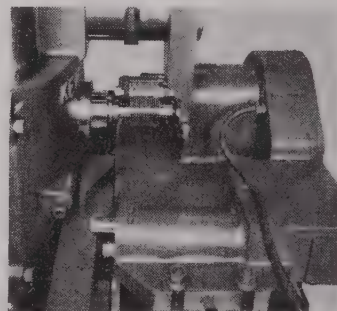
Hydraulic Knife Grinder

FLEXIBILITY and ease of control over grinding operations is available to users of shear blades and straight knives with the new hydraulic NT grinder. The machine features a hydraulic drive permitting variable table speeds from 10 to 70 fpm, with finger-tip control. A high work speed giving a rough finish can be hydraulically reduced automatically without stopping the machine to a lower work speed giving a high finish. Self-aligning 5-in. V ways on the cabinet base and carriage absorb grinding pressure and permit heavy cuts and fast feed with a minimum of vibration. An automatic motor driven oiling system provides a constant, clean film of oil for table and bed ways. A separate 2 hp motor controls the hydraulic sys-

tem and the 16-in. segmental grinding wheel is operated from a 7½ or 10 hp motor. Seven sizes of the hydraulic grinder are available: 38, 48, 78, 90, 102, 110, and 134. *Samuel C. Rogers & Co. For more information, check No. 6 on the attached postcard.*

Milling Machine

A N automatic indexing fixture and all necessary tooling for milling irregularly spaced vent slots in piston rings has been designed for a Kent-Owens 2-20 milling machine. A group of rings are mounted on an adaptor that is placed in the fixture, after which the table feed is engaged. The balance of the operation, including milling, indexing, etc., is completely automatic. After the last slot has been milled the fixture, mounted on the table, returns to the loading position and stops. Additional work-holding adaptors

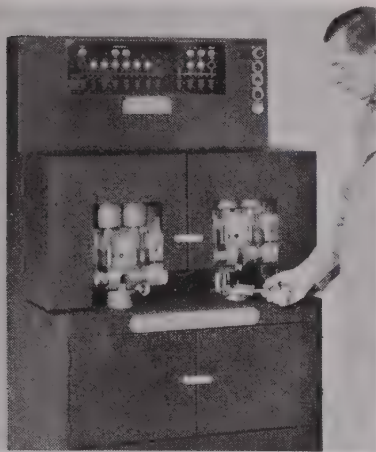


permit unloading and loading of rings while the rings in the fixture are being milled. The table is 42 x 12 in. with 20-in. travel. Twelve spindle speeds range from 64 to 860 rpm. *Kent-Owens Machine Co. For more information, check No. 7 on the attached postcard.*

Automatic Gaging Machine

TWO identical mechanisms for gaging, classifying, and stamping are incorporated in an automatic Airlectric machine for gaging and classifying refrigerating unit muffle boxes. One spindle can be unloaded and loaded by the operator while the other mechanism is going through the gaging cycle. Maximum rate of operation permits the checking of 1500 parts per hour. Parts are manually placed in gaging position, which automatically starts the cycle. A clamping device descends and locates the muffle box for gaging. The average diameter

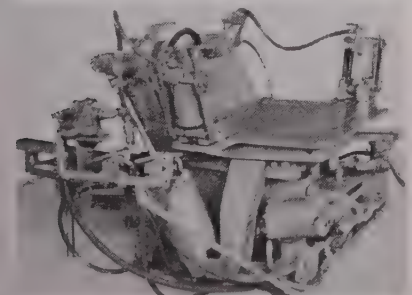
of the counterbore is checked with a multiple orifice solid tungsten carbide spindle connected with a series of gaging heads. For selective classification, any of three in 0.0003-in.



increments each, is retained by a memory device. Depth of counterbore is checked at the same time, and its classification set up, any of seven in 0.0003-in. increments. The final classification, one of 21 in 0.0003-in. increments, is then automatically stamped on the muffle box by metal die stamping mechanisms. Lights indicate dimensions out of tolerance, and the stamping device is not actuated. *Sheffield Corp. For more information, check No. 8 on the attached postcard.*

Power Draw Machine

INCREASED production and reduced operator fatigue are claimed for a new 21-in. jar-ram, power rollover, power-draw machine. Capacity of the machine at 80-lb air pressure is 450 lb. Pat-



tern draw is 8 in. and table measures 21x28 in. The manufacturer has also designed a new counterbalancing mechanism that increases production of molds with jar-ram, hand rollover, hand-draw machines. *Tabor Mfg. Co. For more information, check No. 9 on the attached postcard.*

Pipe and Bolt Threader

A PORTABLE power tool threads $\frac{1}{8}$ to 2-in. pipe, $\frac{1}{4}$ to $1\frac{1}{2}$ in. bolts, and with drive shaft and geared tools it will thread up to 8-in. pipe. This Model B pipe threader has an automatic switch lock and chuck wrench holder. The eccentric spool pipe-steady, independent of spindle, absorbs the whip of long lengths of revolving pipe, eliminating practically all spindle wear. A gear driven oil pump provides ample flow of coolant. Other features include quick-opening, fully-adjustable, ring-type dieheads; ball bearing, self-centering wheel-and-roller cut-off; motor with reversible switch, right-hand operation like a lathe, and an all-steel three jaw universal chuck. *Beaver Pipe Tools, Inc. For more information, check No. 10 on the attached postcard.*

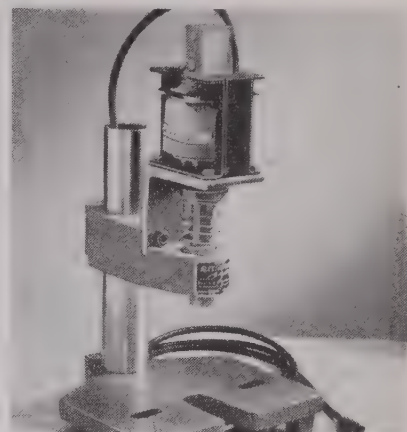
Burnishing Barrels

REDESIGNED Mercil burnishing barrel units are now supplied with a reducer type direct-connected drive with motor, thus eliminating spur gears. Three roller bearings in a supporting ring have been placed under the barrel at the forward end, helping alignment, and serving to distribute the weight of the load over the entire barrel. This reduces horizontal stresses on the main shaft, the barrel and cover shaft. The metal flange at the top of the barrel has been increased from $\frac{3}{4}$ to approx 2 in., and the thickness increased from 3.6 to $\frac{1}{2}$ in. Each burnishing barrel is one integral piece without drilled holes and chances of leakage are eliminated. The bottom of the barrel has been increased to 1 in. thickness. The cover gasket is seated on the steel flange instead of on wooden blocks. The trunion brackets have been placed nearer the center of gravity, improving the load balance which permits greater ease in handling. Totally enclosed ball bearing type motors are now used. *Hanson-Van Winkle-Munning Co. For more information, check No. 11 on the attached postcard.*

High Speed Punch

A NEW high speed Electropunch incorporates a high temperature silicone insulated coil in a rugged solenoid that permits operation

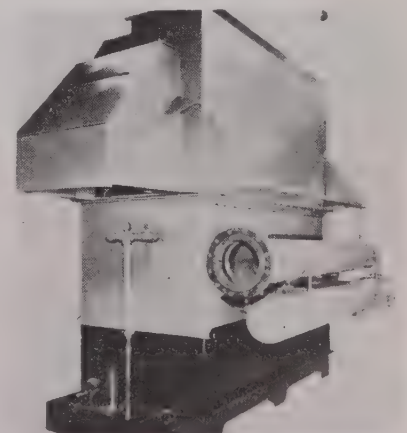
continuously at 150 blows per min, delivering an impact of more than a ton. This model is suitable for staking, riveting, wire cutting, blank-



ing, forming and drawing of metals and plastics. The punch weighs 45 lb, and takes 1 sq ft of bench space. *Black & Webster, Inc. For more information, check No. 12 on the attached postcard.*

After Cooler

THE new model Aero after-cooler is simplified in construction and protected from freezing in outdoor installations. The equipment dehydrates compressed air or gas by cooling it to a temperature below the dry bulb temperature of the atmospheric air, thereby removing the moisture that condenses at that point and preventing

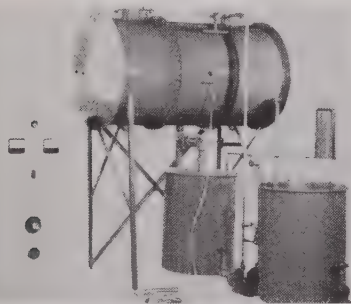


further condensation of water in air or gas lines in use. A recirculating water spray is evaporated on the surface of a coil through which the compressed air passes, creating a temperature close to the wet bulb temperature of the surrounding atmosphere, lower than the dry bulb temperature, and below the

summer surface water temperature. Protection against freezing is provided by balanced-wet-bulb control. *Niagara Blower Co.* For more information, check No. 13 on the attached postcard.

Electronic Gas Filter

A NEW electronic gas filter is available that will enable steel mills to thoroughly clean the by-product coke oven gas. The filter was designed to filter fuel gases where tar fog, coke dust, fly ash, line dust or any combination of dirt cause trouble. It is a standard package consisting of a steel housing that contains the ionizing-collecting cell; a power pack supply; a solvent recirculating system with solvent recovery still; and necessary piping and electrical connections. The filter housing, 38 in.



diam. x 60 in. long, may be suspended from the piping or rested on a trestle. Rated capacity is 60,000 cfm at a cleaning efficiency of 98 pct by the discoloration method. The solvent washing and recovery system can be remotely located. *Trion, Inc.* For more information, check No. 14 on the attached postcard.

Impact Air Hammer

A NEW impact hammer, Model No. 105, has a capacity of approximately 15,000 lb at point of impact. Working surface of the table is 7x9 in.; overall height is 44½ in.; throat depth, 4½ in.; maximum daylight opening is 18 in. and maximum stroke, 8 in. *Mead Specialties Co.* For more information, check No. 15 on the attached postcard.

Spray Painting Tanks

STANDARD pressure tanks for spray painting are now available in capacity range from 2 to 60

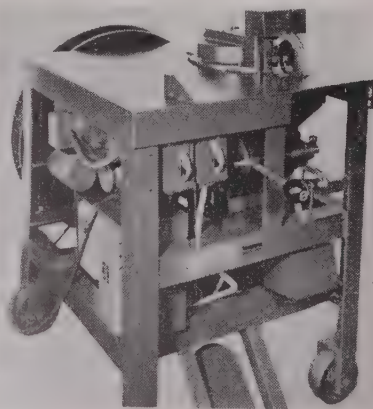
gal. They have seamless drawn steel shells and are galvanized inside and out. Made to meet ASME specifications, they will handle



working pressures to 110 lb. Steel bands welded to the concave bottoms provide solid support. Cadmium plated pressed steel lids are secured with C-type clamps. Tanks are available with manual or motor-driven agitators, top or bottom outlet. *Binks Mfg. Co.* For more information, check No. 16 on the attached postcard.

Power Strapping Machines

ELECTRICALLY and electro-pneumatically powered, new large-capacity strapping machines mechanize the basic operations of applying tensional steel strapping to manufactured items during

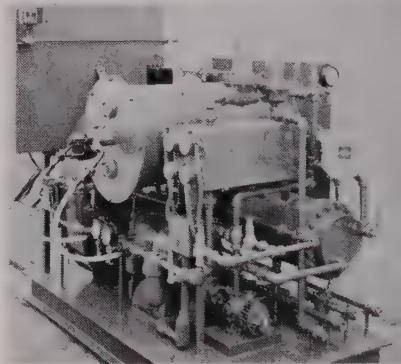


mass-production fabrication or assembly, or to commodities for shipment. The machines perform the four basic operations of strapping; encircling, tensioning, sealing, and cutting. In the electrically driven Type 3A fully-automatic power strapping machine illustrated, the

work of strapping small-dimension items is totally mechanized by a precision built, heavy duty automatic strapping head with a timed cycle electrical control mechanism. Operation of a foot pedal starts the cycle of encircling the item with the correct amount of strap, tensioning the strap in place, affixing and crimping the seal, and finally cutting the strap. The mechanism repeats the operations in correct sequence instantly following completion of the cycle. *Signode Steel Strapping Co.* For more information, check No. 17 on the attached postcard.

Automatic Burner

DESIGNED to fire boilers at capacities of 100 developed hp and upwards, a new automatic burner is a completely self-con-

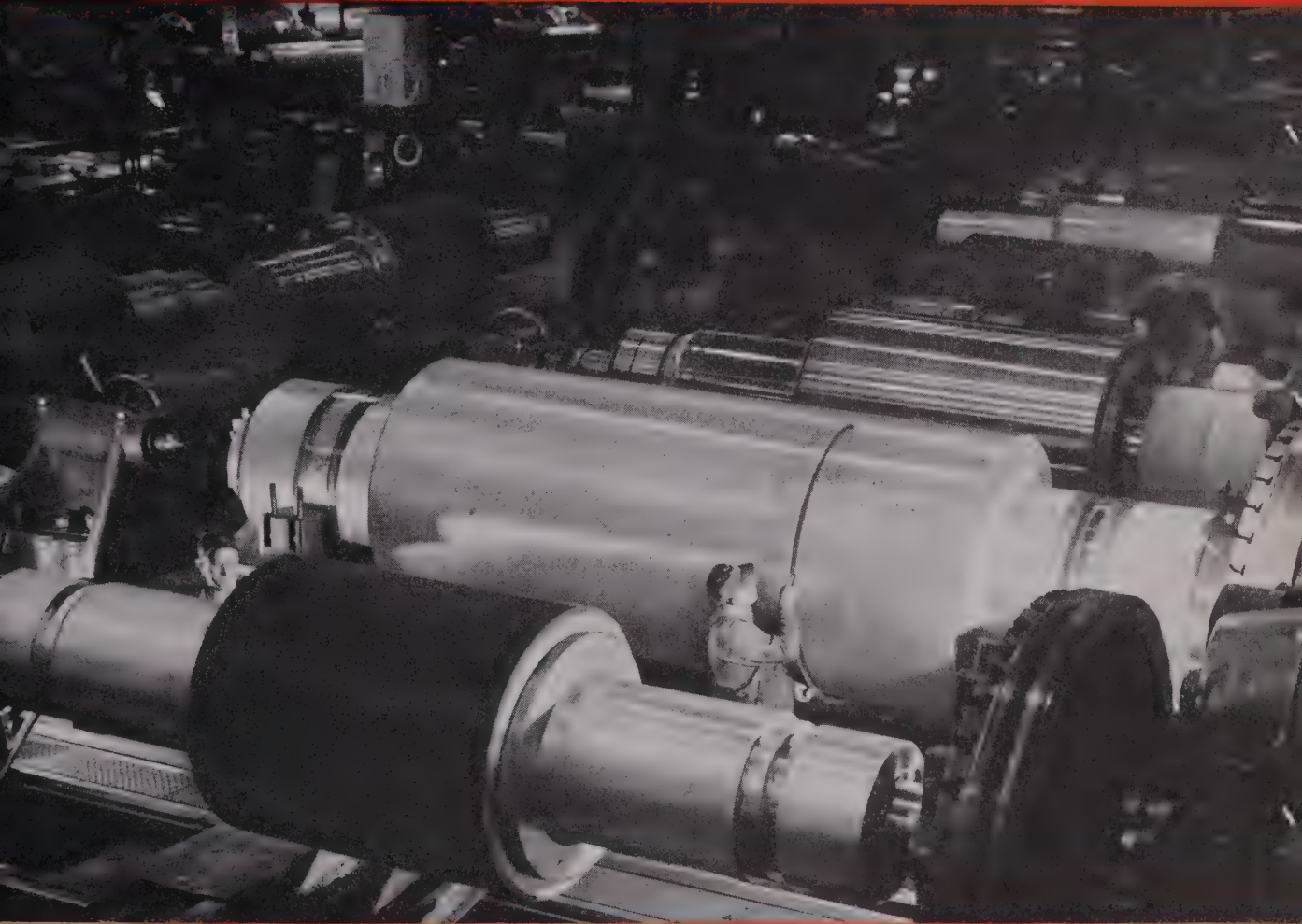


tained, packaged combustion system. Available for both automatic and semi-automatic control, the burner incorporates a complete system of fuel-oil pumping and oil pre-heating equipment, forced-draft blower, and wide-range constant differential mechanical atomizing oil burner; all mounted on a compact steel base ready to be bolted to the boiler front. The automatic burner is equipped with electrically actuated automatic safety controls consisting of gas-electric ignition, electronic flame failure protection, fuel oil shutoff valve, steam pressure limit switch, gas pressure and low fuel oil temperature cut-out switches. The fan and fuel oil pump are driven by the same motor. *Peabody Engineering Corp.* For more information, check No. 18 on the attached postcard.

Metalworking Lubricant

A NEW development in the field of extreme pressure additives is Esscee Soluble No. 820, a sulfur

MESTA ROLLS



A section in one of the Mesta Roll Shops

Mesta produces all sizes of iron and steel rolls including the largest used in industry today. Efficient plant equipment, skilled workmen with long service records, an engineering staff whose technical ability has been accumulated over many years—these resources are responsible for Mesta's leadership in the production of the finest in rolls and other rolling mill equipment.

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• Labor unrest will be reflected in the auto industry during 1949 . . . Union will present long list of demands on Ford . . . Kaiser - Frazer doubles weekly benefits paid to its workers.



DETROIT—Unless present signs fail, the auto industry will see another year of noisy and badly confused labor-management relationships.

The fact that labor's demands may be made this year against a background of growing unemployment and a melting market for cars, particularly in the higher priced field, is not expected in the beginning at least, to temper these demands. As in past years, union politics is expected to play an important part in the Ford negotiations, despite efforts by cooler heads on both sides of the bargaining table to eliminate "window dressing" from the original negotiations.

Announced demands of the International UAW-CIO for the industry include \$100 a month pensions starting at the age of 60; social security including health, hospitalization and insurance benefits; and a cost of living adjustment to restore the workers' buying power to 1946 levels. It is important to note that wage increases will occupy the No. 3 position this year.

Unfortunately, this may be only the beginning of the demands that

will actually be presented to Ford. Ford Local 600 elections are scheduled to be held prior to the start of negotiations on May 15 and union politicians are reported to be promising their followers just about everything that occurs to them on the eve of these elections. Factions within the union are already reported to be beating the drum for additions to the list of demands that appear fanciful in the extreme to persons unfamiliar with the past history of Ford negotiations.

These demands are reported to include: abolition of the Umpire; company-paid pensions and health insurance; reduction of the present 6-month probation period for new employees to 30 days; elimination of the present 4-year clause in the Ford seniority agreement; a proposal to eliminate maintenance work on tools and dies by outside firms; and abolition of the "No Strike" or company security clause.

BELIEVED to be an inspiration of the extreme left wing element in the union are proposals to eliminate the Ford Labor Relations Dept. and a 6 hr day-30 hr week with pay remaining at a 40 hr level.

Another unpromising aspect of the coming Ford negotiations is that efforts on both sides to limit the size of the bargaining committee to a few representatives appear to have failed, temporarily at least. In the past, as many as 18 union representatives have been included on the union bargaining committee. This has made it extremely difficult and sometimes impossible to get agreement among the union representatives. Primarily because of the unwieldy committee and the greatly extended list of grievances, negotiations a year ago dragged on for 6 weeks before real progress was made.

As some local observers see it, that fact that Walter Reuther is expected to take an active part in this year's Ford negotiations may make a considerable difference. It

will be recalled that agreement was reached last year in a few days after Mr. Reuther was able to take an active part in the negotiations.

Not all of the confusion in the Detroit labor picture can be laid to factionalism in Ford Local 600. Uncertainty about changes to be made in the Taft-Hartley law is another factor. Also, auto management has forebodings about labor's determined efforts to broaden the field of collective bargaining. With the Inland case ruling in favor of expanding the collective bargaining area, many executives here are wondering where the bargaining snowball will stop. As some local observers view the auto situation, labor has already got its foot in the managerial door through the new contract with Kaiser-Frazer. The new contract which went into effect Feb. 1 doubles the social security benefits previously received by K-F workers. The new plan will be administered by a union-management board of trustees.

CONTRARY to widely held opinion, Ford is not the first to face the union's 1949 siege guns. Negotiations have now been going on quietly at Murray Corp. for several months. There are as yet no indications that significant progress has been made; in fact, available reports are distinctly to the contrary. This may indicate how difficult it will be to reach agreement with the union this year. Some sources believe that nothing important should be expected to come from the Murray talks until the new Ford contract has been hammered out.

It can be depended upon that Walter Reuther will play his trump cards carefully and effectively. In making his primary demands for social security benefits and pensions rather than wages Mr. Reuther will, in the eyes of many union members, be only demanding "humanitarian treatment" for the workers—he will not be asking for another wage boost. By this maneuver he may also be able to



2 Wheelabrator Tables Clean **125 TONS** Daily

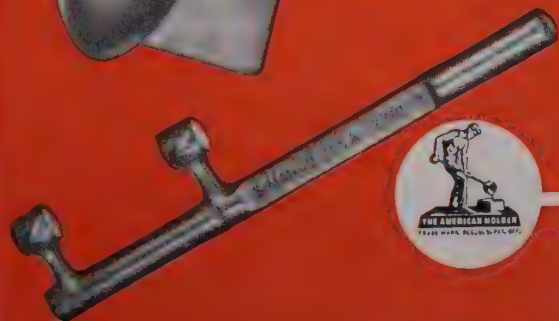
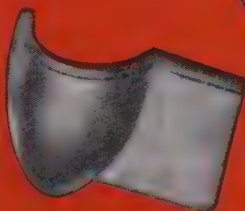
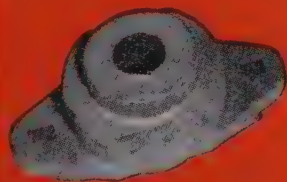
The Airless WHEELABRATOR is its own best salesman because its performance speaks louder than words. For example, a prominent eastern manufacturer of textile machinery installed its first Wheelabrator in 1938 and then added 15 others in various departments during the next 9 years.

In the foundry division two Wheelabrator 10' Plain Tables clean more than 125 tons of gray iron castings daily. Among the heaviest pieces are 30" diameter loom head heads. The cleaning time for the average part is two minutes per side. Production is so rapid that it takes two men to keep the work flowing to and from the machine.

The foundry is also equipped with four 48" x 42" Wheelabrator Tumblasts, each having an operating load capacity of 17½ cu. ft. These machines clean a total of 200 tons of castings per day . . . average loads weigh 1,300 lbs. and individual pieces weigh from 4 oz. to 75 lbs. Cleaning time is from 5 to 10 minutes per load.

With output flowing at such a pace it is no wonder that Wheelabrator cleaning costs are the very lowest . . . that Wheelabratrors pay for themselves in short order. Little wonder, too, that Wheelabrator is the popular choice of foundries everywhere. Repeat orders tell the story perfectly . . . 37 plants use 10 to 209 machines each . . . 462 others have 2 to 10!

The many advantages of Wheelabrator airless blast cleaning, typical performance data, and descriptions of the entire line of equipment are contained in Catalog 74-A. Write for your copy today.



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minimize the effectiveness of direct comparisons with the GM wage contract which now looms as a "Rock of Gibraltar" in 1949 wage negotiations in the auto industry. (It now appears reasonably certain that GM workers will take a 3¢ cut in March but this will be restored by the 3¢ annual improvement factor due in May.)

Nobody here knows what Ford is prepared to offer the union this year but most sources guess the company offer will be much less than the Ford pension offer of a year ago. At that time, Ford of-

fered the union a 15¢ wage increase or a 7¢ wage boost plus an 8¢ credit to a pension fund. The Ford worker was to contribute 3¢ in addition to the pension fund. This offer, it will be recalled, was voted down by the union.

The fact that both Ford management and Walter Reuther have gone on record as favoring a pension points to a possible settlement in this field although it is no secret that the two sides appear to be far apart in their present ideas as to what might constitute an "adequate" pension for Ford workers.

K-F Adopts Insurance Plan

Willow Run

•••Some idea of the probable social security pattern for the auto industry can be obtained by examining the recent Kaiser-Frazer agreement. Under the terms of the new contract the weekly benefits have been increased from \$15 for 13 weeks to \$30 for 26 weeks. K-F pays 5¢ for each hour worked by the union member into a fund that is unique in the auto industry. The same payments and benefits are provided for 800 nonunion and salaried employees. This fund is

used to finance a \$2000 life insurance policy and to provide Blue Cross medical service including up to \$150 in surgical benefits for each employee and his immediate family.

No payroll deductions are involved. Disabilities are paid both for on-the-job and off-the-job injuries. Payments begin the first day of disability if the employee is hospitalized or is involved in an accident. Workers continue to be insured for on-the-job accidents under the workmen's compensation law.

The fund is administered by a board of trustees headed by Frank

Cotter, president of Local 142 at Willow Run. There are three other union representatives. K-F is represented on the board by J. F. Reis, K-F vice-president in charge of fiscal operations; J. O. Murray, director of industrial relations, and Dr. Clifford H. Keene, medical director. Acting as advisers to the board are Harry Becker, director of the International UAW-CIO Social Security Dept. and Murray Latimer, a social security consultant.

Reuther Ties U. S. And Canadian Plants Together

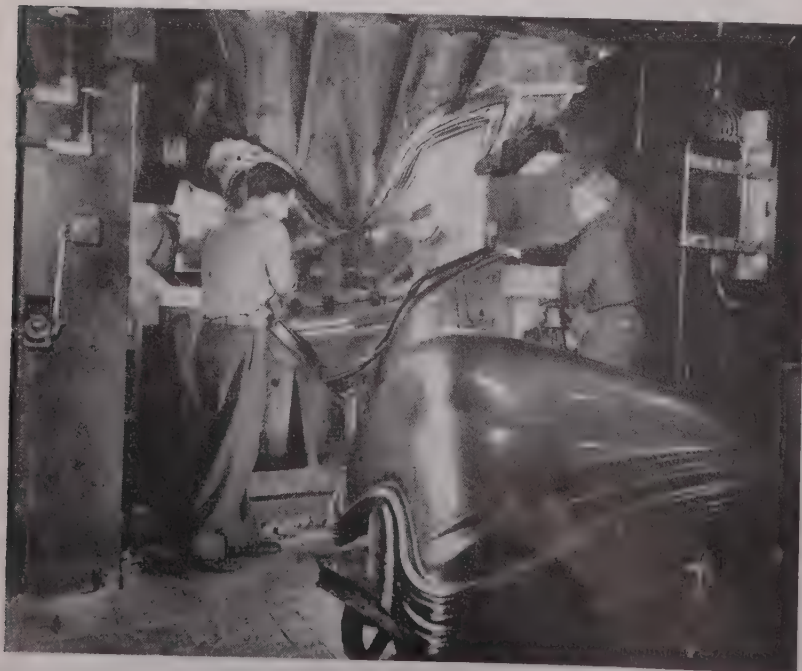
Windsor, Canada

•••In a surprise move here last week, Walter Reuther told 2000 cheering delegates that "Nobody settles until everybody settles," thereby tying together the Ford of Canada and U. S. Ford negotiations. Most sources believe this move was made to strengthen Mr. Reuther's demands for narrowing the wage differential of approximately 50¢ per hr that is reported to exist between the U. S. and Canadian plants.

Most of the crystal ball gazers here are inclined to believe the opening of the Ford contract negotiations May 15 will be preceded by all the fireworks the union representatives can command. The International UAW-CIO is well equipped to do this. Their efforts will undoubtedly be effectively supplemented by the vociferous minority in Local 600. If past experience is any criterion, there may be some well publicized work stoppages at the Rouge to back up the union demands.

The prospect of an authorized strike at the Rouge is anybody's guess but the following facts may be worth noting: A strike may be called even though the feeling of the membership is overwhelmingly opposed to strike action. Also, factionalism in the Ford local may effectively prevent a settlement even on terms that might be acceptable to the International union. Finally, according to informed opinion here the present union demands are so costly that a considerable union retreat will have to be made before a settlement can be reached. Sources close to the Detroit labor picture have their fingers crossed as they try to evaluate the possibility of a strike at the Rouge in 1949.

BIG DRAW: Workmen at the Chevrolet-Flint manufacturing plant are shown forming right front fenders. This is a severe forming operation for which steel must be carefully selected. Blanked stock is fed to the mill from the rear. After forming the fender is partially ejected. Workmen take up from there on. Note the formed impression of the headlight which is punched out in the next operation.



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Warehouses vary in their characteristics as much as do the twelve types of stainless steel sheets. For example, if you're the kind that likes alert, responsive action on your orders, the warehouse for you is Wolff Metal Service where you can always get next-day delivery on your requirements . . . frequently enough same-day delivery if you are located within the immediate Chicago area.

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• Solution to delivered price problem in sight
... Supreme Court ruling may decide issue
... Federal Trade Commission and Congress may also act.



It is entirely possible that the Federal Government will go still further and approve systematic freight absorption, provided (1) such absorption of shipping costs is made in good faith to meet a competitor's price, and (2) there is no combination or conspiracy among sellers.

One thing is clear, however. Basing point systems as they were employed prior to 1948 are out. Gone forever. There is no return.

THE decision of the Supreme Court to review the Rigid Conduit case came as a surprise to no one. There is general agreement that the court may rule—probably within the next 90 days—that the circuit court's decision was in error and that there is nothing illegal about delivered prices—provided such prices are not derived via the conspiracy route.

In the Rigid Conduit case, the Circuit Court upheld the Commission's order in which count one held that this industry had conspired to use the basing point system and in count two found that individual use of the basing point method with knowledge that it was used by other sellers also constituted an unfair method of selling. Elimination of count two of this order, according to some sources, means that industry could legally quote delivered prices and absorb freight if this was done in good faith to meet competition.

There is also a distinct possibility that the FTC may take it upon itself to end the controversy. The Commission at the present time is giving more serious attention to clarifying the situation than at any time previously. Particular attention is being directed to count two of the conduit order. It would not be too surprising if the Commission, in its presentation to the Supreme Court on the Rigid Conduit case, on its own motion modified its order in this case. Should this situation come about, it is also not too much to expect the Commission to modify its order in

the Pittsburgh Plus case—giving the U. S. Steel Corp. authority to absorb freight.

NOR is it too far-fetched to assume that the controversy might be settled by President Truman by means of his appointments to the Commission. There are now two vacancies on the five-man Commission. One of the vacancies must be filled by a Republican. The present Republican member of the Commission, Acting Chairman Lowell B. Mason, has gone on record as stating that he is not a party to the f.o.b. mill crusade. Should the men appointed to fill the two existing vacancies be of like mind, there will be a 3-2 majority on the Commission with full authority to amend any existing orders affecting delivered prices.

But despite what ruling may be forthcoming from the Supreme Court and the FTC, there is still considerable sentiment on Capitol Hill for legislation which would definitely spell out industry's authority to absorb freight and quote delivered prices. It is felt that this is necessary due to the fact that what the courts and FTC have done and may undo, they can do again sometime in the future. In other words, there is a growing conviction among both Democrats and Republicans in Congress that clarifying legislation must be enacted regardless of what the FTC's policy may be from week to week.

THE legislation being considered by the Senate is S. 236, introduced by Senator Johnson, D., Colo., which would legalize freight absorption in the absence of conspiracy. As a result of hearings held on this legislation several weeks ago, the bill is now being rewritten by the staff of Senator Johnson's Trade Policies Committee. Hearings on this revised legislation will probably get under way next week but it will probably be many weeks before the Senate is ready to vote on the measure.

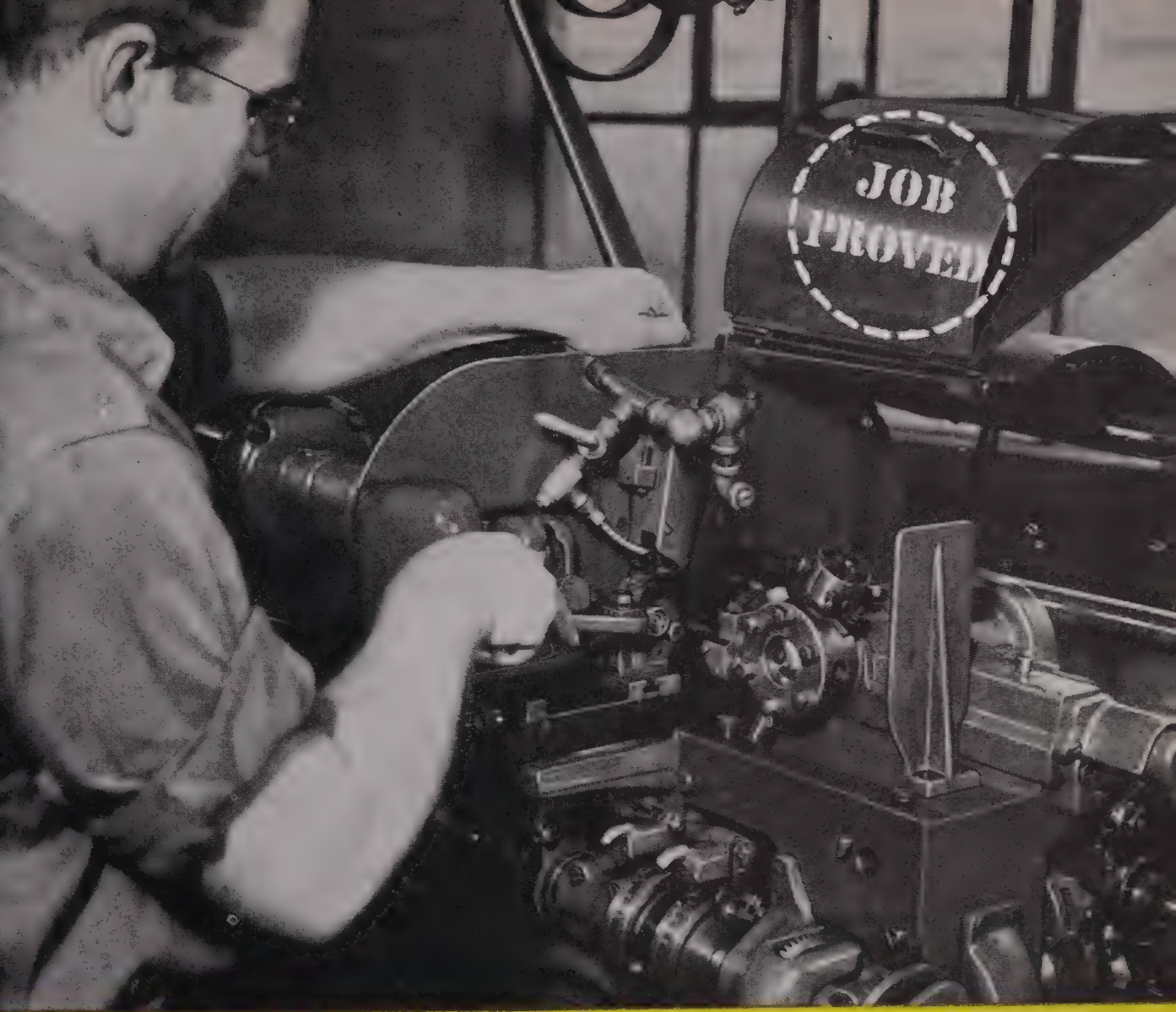
WASHINGTON — Like the giant arms of a military pincer movement, the many facets of the basing point controversy are converging on the same result—legal authorization for industry to absorb freight in order to meet competition.

In other words, the end of the struggle by businessmen to achieve a practical solution to the price chaos fostered by the Federal Trade Commission is now in sight.

Whether the Supreme Court, the Congress, or even the Federal Trade Commission re-establishes the right of businessmen to absorb freight is an incidental question.

The important thing is that the period of doubt and uncertainty as to the legality of pricing methods soon will be ended.

Just what form the forthcoming approval of freight absorption will take is still anybody's guess. At the very least, sanction will probably be given to the practice of prepaid freight when requested by the customer.



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Part: Stud pulley for radio
Material: B 1112 steel
Tools: Rex AA high-speed circular form tools
Spindle Speed: 2,600 R.P.M.
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Petrofac are making possible better finishes than ever, and faster work in a wide range of operations. The new Sunicut grades with Petrofac possess superior metal-wetting, anti-weld, and extreme-pressure qualities. They are not blended with animal or vegetable fatty oils—cannot turn rancid. For additional information about the various Sunicut cutting oils, write for folder 1A-2.

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On the House side of Capitol Hill, the situation is vastly different. In sharp contrast to the spadework that has already been done in the Senate beginning last summer when the Trade Policies Committee bombarded the country with questionnaires asking for the opinion of business on this question, practically nothing has been done in the House.

Companion legislation to Senator Johnson's bill has been introduced in the House but there have been no hearings and none are scheduled at the present time. However, an interesting proposal was contained in a bill dropped into the hopper by Representative Walter, D., Pa., within the last two weeks. This bill, H.R. 2222, would suspend for two years those anti-trust laws which either directly or indirectly rule out delivered prices. It would not affect cases now before the courts.

WHILE this proposal is new insofar as legislation is concerned, it has been discussed in industry circles for many months. It is felt that this proposal has merits for two reasons: (1) that over a two-year period an ex-

haustive and impartial study could be conducted resulting in legislation which would stamp out all traces of the FTC's f.o.b. mill crusade, and (2) that within the next two years, the supply and demand situation in cement and steel will be somewhere nearer a normal situation which would clearly outline for Congress the chaos created by the Commission's crusade.

But unless Representative Walter's bill has support that is not now evident, it is not likely to be given serious consideration. The most that could be hoped for in regard to this type legislation would be passage as a stop gap measure at the close of the session this summer in the event that legislation such as Senator Johnson's bill gets lost in the last minute shuffle.

Summing up, it appears that one way or another the issue will be settled—and settled soon. Notwithstanding the economic theorists in the administration who have fought and who will continue to fight any pricing system other than f.o.b. mill. The various arms of the Federal Government are apparently coming around to the realization that the present problem is basically a non-partisan one

and must be realistically settled once and for all if businessmen are to have any confidence in the legality of their sales methods.

Reciprocal Trade Pact Program Is Continued

Washington

• • • Continuation of the reciprocal trade agreements program until June 1951 has been provided in a bill (HR 1211) approved by the House Ways and Means Committee.

There are only minor changes made in extending the present act. One restores the Tariff Commission to its former equal rank with other agencies in considering tariff changes, and returns its powers to make recommendations.

The Republicans are expected to fight for retention of the "peril point" provision which has been dropped from the new bill. This would require the Tariff Commission to indicate minimum rates below which it believes it would not be safe to go in the interest of domestic industry.

There are now 42 nations having reciprocal trade agreements with the United States, 22 of which were brought in during the Geneva convention in 1947. In April, a meeting of 14 nations will be held at Annecy, France.

Most of the Foreign War Surplus Property Is Sold

Washington

• • • About 99 pct of over \$10 billion worth of war-generated surplus property in foreign countries has been disposed of, according to the report of the Foreign Liquidation Commissioner.

Exclusive of military disposal, the OFLC has sold \$9233 million worth of property for a total of \$1.8 billion—or about 19¢ on the dollar of original cost. Inventories have been reduced to \$116 million.

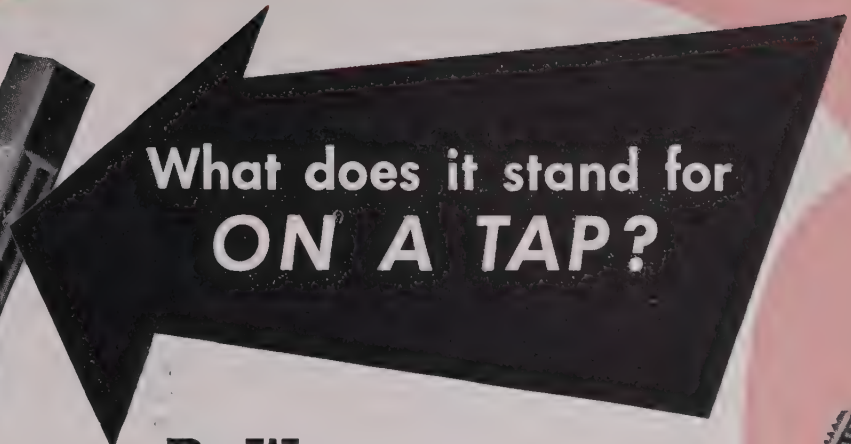
Of the remaining inventory, only about a fourth is available and saleable. The remainder, the agency says, is either committed, being listed, or pending withdrawal by the declaring agency.

Inventories for disposal include \$22 million in Europe, \$3 million in Canada, \$2 million in Latin America, and \$71 million in the Pacific and Far East.

THE BULL OF THE WOODS

BY J. R. WILLIAMS





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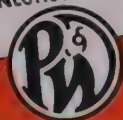
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• Scrap, ore and semi-finished steel shuffle across Pacific . . . Auto production continues at high level despite market softening . . . \$40 million metal loss caused by Utah strike.



SEATTLE—A gigantic game of shuffle-board is being played between Japan and the West Coast.

The weights in this game which have been shuffled back and forth across the Pacific since before the war are, of course, large tonnages of steel scrap and iron ore.

Local longshoremen this week were wearing ironical smiles as they unloaded Seattle's first shipment of scrap steel from Japan. It was back in the late 1930's and 1940's that they were bitterly protesting loading scrap iron and steel for shipment to the Orient without much success.

This first shipload is part of a 9000-ton shipment of Japanese scrap destined for Bethlehem Pacific Coast Steel Corp. here and consists principally of heavy cut-up, semifinished arms, casings, mountings and ingots intended for guns—practically all of it low alloy steel. While carbon steel scrap would be much more welcome, the Supreme Council won't let that out of Japan. The steel arriving here might well have been made from the scrap shipped from the West Coast ten or more years ago. The first shipment arrived in Panamanian freighter "Enterprise"

and is but one of several such shipments scheduled for delivery to Bethlehem here and in San Francisco and Los Angeles.

Columbia Steel Co. also has contracted for substantial tonnages of low alloy scrap from Japan, and for carbon scrap from Hawaii and Guam. This material is expected to begin arriving in San Francisco and Los Angeles within a few months.

THE "Enterprise" is scheduled to pick up a cargo of iron ore at Long Beach, Calif. for the return trip to Japan. Practically 100,000 tons of ore from Utah mines has been shipped to Japan under contract with the Supreme Council of Allied Powers and practically 200,000 additional tons are under contract for delivery to the Orient.

Steel production in Japan has been reported as rapidly increasing. In the last 9 months of 1948 the mill at Yawata produced more than 305,000 tons of pig iron, 409,000 tons of ingots and 303,000 tons of rolled steel, according to occupation headquarters. This was said to be an increase of 100 pct over the same period in 1947.

Semifinished steel is being shipped out of Japan to eastern and Gulf ports according to officials of the Dulien Steel Products, Inc. which has the Greek steamship "Argovic" under charter to sail from Yokohama to Houston with a cargo of 9000 tons of steel. Another Greek steamship, "Eurypedes," is also under charter to Dulien and will load steel in Muroran and other ports in Japan for the Gulf and East Coast ports.

H. B. KEIFLER, vice-president and general manager for Dulien here, indicated last week that "much more steel scrap is scheduled to arrive in this country soon from Japan." He reported that during a recent visit to the Orient he saw two lots of 130,000 and 50,000 tons of fine steel in warehouses.

There are those in the industry who believe that this game of

shuffle-board is just getting into stride and there are at least a few who indicate that it won't be too long before the nature of the weights change. Louis Dulien, president of Dulien Steel Products, recently told THE IRON AGE that he would not be surprised to see steel scrap being shipped from the West Coast back to Japan within 2 years.

Even though this alloy scrap is not all that could be desired by West Coast producers, undoubtedly its arrival and anticipation of future shipments has had its effect in lowering scrap prices on the Coast. Major buyers in the West dropped their offering price \$2.50 a ton for No. 1 and No. 2 heavy melting effective last week. However, commitments previously made are being carried out at the former prices with no cancellations indicated. Reduced prices in the East, of course, have had a leveling effect locally in that it reduces the incentive to ship local material there.

LOS ANGELES—Despite a softening in the retail sales of automobiles in southern California, factory production for almost all lines in assembly plants here remains high with a few showing increases.

Although auto men acclaim the southern California area as one of the most lush sales districts in the nation, production now has reached the pace where almost all cars are available for immediate delivery or for delivery within a very short time after order.

Chevrolet dealers, with a new model on their show floors, in general have sufficient orders so that a delivery delay of a few months is necessary without a trade in. Some models of General Motors' new Pontiac, however, are available with only a short wait. Immediate delivery is possible on most other cars.

All but one of the assembly plants in the Los Angeles area are working at a steady pace, apparently reflecting some optimism in the auto market.

The only exception is the large

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2. Resistance to High Temperatures

3. Non-Magnetic

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Chrysler plant here where Plymouths, DeSotos and Chryslers are turned out. Production has been slowed down there temporarily to allow for the changeover to new models and employee layoffs have been heavy. The plant has a capacity of 480 cars per day but the peak has varied below that, usually because of steel shortages.

At the General Motors plant in nearby South Gate the production line continues to turn out 40 cars an hour or 320 per day with a mixed variety of Buicks, Oldsmobiles and Pontiacs. After being shut down for about a month to prepare for the new model, the Chevrolet plant at Van Nuys is rushing out cars at a rate of 240 per day.

Ford recently cut back eight cars a day at the Terminal Island assembly line. Plant officials say this is because of steel shortages in Detroit. The assembly line is rolling out 172 passenger cars and 30 trucks daily. Ford's new Lincoln Mercury plant at Maywood is producing 97 Mercurys and 15 Lincolns each day.

Studebaker, which has enlarged facilities here three times in the last 2 years, increased production by five cars an hour last month and now is turning out 138 cars a day.

The smaller Willys-Overland plant recently increased daily pro-

duction from 20 to 35 cars per day. This was because of increased facilities in the paint plant. All models can now be made here, whereas only jeeps were assembled in Los Angeles until recently.

Uses 3 Types of Power

El Segundo, Calif.

• • • Douglas Aircraft has disclosed that three types of power are being used on the D-558-2 Skyrocket, a research craft designed to explore high speeds and altitudes.

In addition to the jet power used for climbing and the rockets set off as it approaches the speed of sound, the model also can be equipped with Jato to assist in speedy takeoffs.

Buys Wartime Facilities

San Francisco

• • • Basic Magnesium, Inc., subsidiary of Basic Refractories, Inc., has purchased the government-owned land, mining claims, buildings, machinery and equipment at Gabbs, Nev. from which the raw materials were obtained for conversion to metallic magnesium at Henderson, Nev. during the war.

A rotary kiln and other equipment will be transferred from a government alumina plant at Baton Rouge, La. to the Gabbs

operation and Basic will use this equipment and resources to produce magnesia refractories with production scheduled for July. The company has also been authorized to lease the town of Gabbs which was erected during the war to take care of operational personnel. Purchase price of the property and accessories was reported as \$625,000 by the WAA.

Contributes More Power

Salt Lake City

• • • Utah's private power interests are deriving some quiet satisfaction out of the fact that during January the state contributed 40 million kwhr to the government power areas of Washington and Oregon. The Utah Power & Light Co. delivered to the northwest pool approximately 34 pct as much power as was required to meet its own demands. Peak delivery during the period was 70,000 kw.

The contribution to the power-hungry Pacific Northwest was made possible by Utah Power & Light's tie-in with plants of Geneva Steel Co. and Kennecott Copper Corp. The strike at Kennecott's properties, of course, increased the amount of power available to the pool.

Foundry Business Slow

Los Angeles

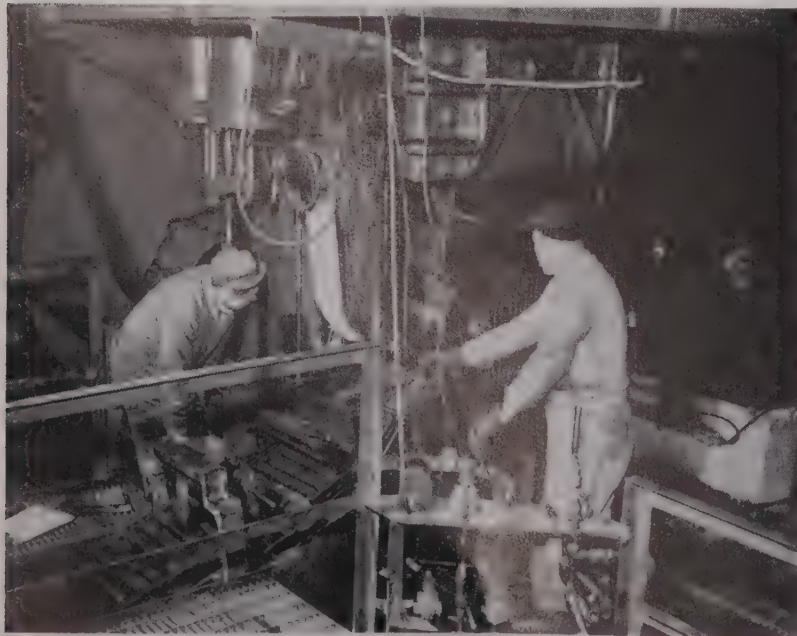
• • • At the time when seasonal pickups usually are noted, southern California foundrymen are finding business slow with few signs of an immediate pickup.

Layoffs and slackening demand for cupola cast, which has contributed to a drop in scrap prices, reflect the situation. A drop in foundry business in the area first was noted late last fall and was attributed to seasonal conditions.

Several of the usually steady foundries have cut to a 32-hr week. Few can advance any real reason for the slowdown unless it is because customers have adequate inventories to meet reduced production schedules. At any rate, backlogs of a few months ago are a thing of the past.

Cupola cast prices, which skyrocketed to as high as \$65 a ton a short time ago, were dropping this week to where some foundries were buying for as low as \$38 a ton.

NEW FIELD: Tie plates for Western railroads are now being produced right in Southern California with the installation of new equipment in the Torrance plant of Columbia Steel Co., a U. S. Steel Corp. subsidiary.



NOW MULTIPRESS* can be Tailor-Made to your production needs



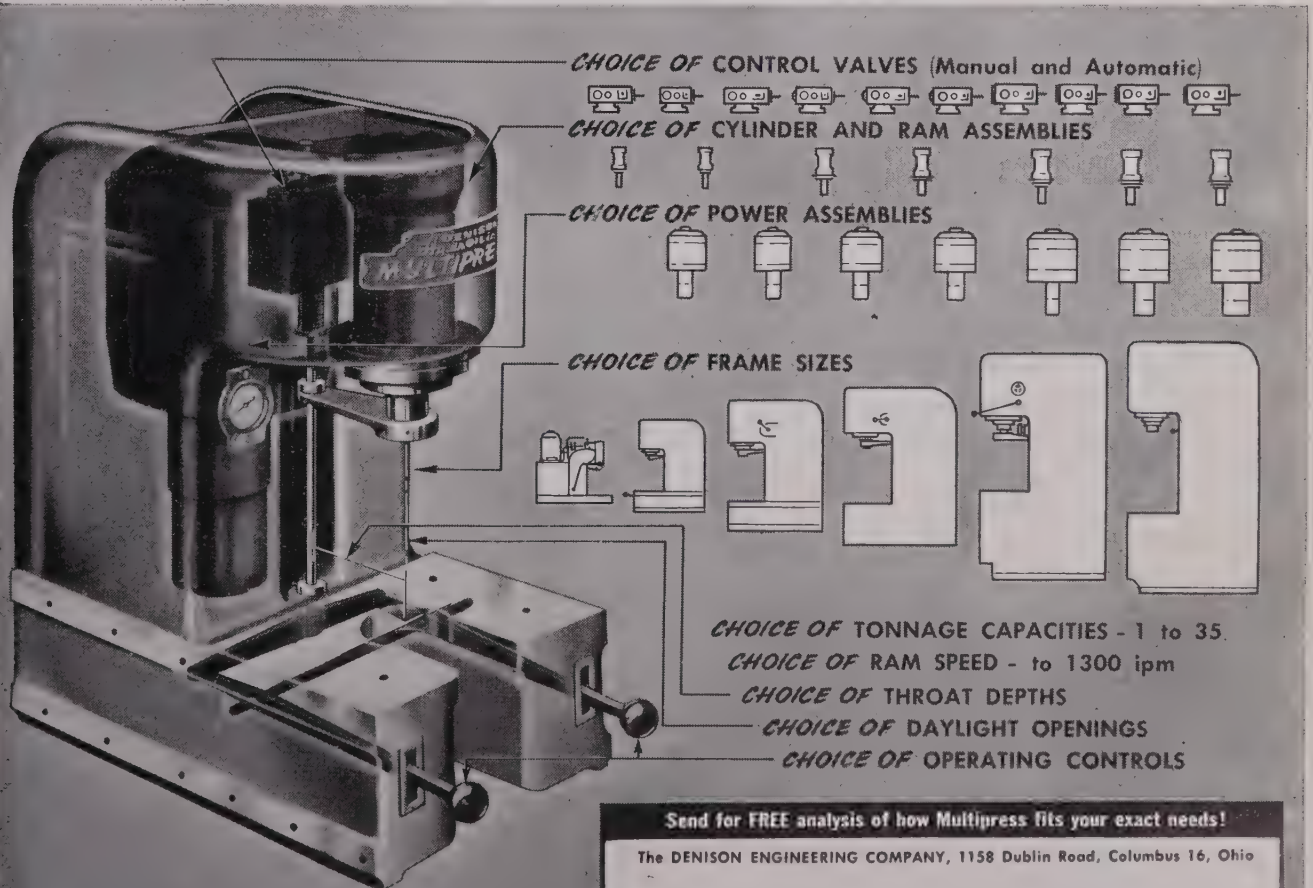
Write your own ticket! The work-speeding advantages of Multipress can now be fitted to *your exact needs*. Your choice of frame sizes can be "custom-tailored" with the valving, cylinder, pump, motor and controls that bring you highest efficiency. You whittle your investment right down to your known requirements. You save on initial costs, operating costs and maintenance costs.

Select the ram stroke, ram speed and tonnage you need, and we'll give you a combination of Multipress features *tailor-made* for top efficiency.

You can take your choice of several types of manual or automatic controls, daylight opening and throat dimensions, and other features.

The smooth, positive, fully regulative oil-hydraulic action of *any Multipress assembly you select* gives you a head start toward faster, reject-free productions. And quick, easy, wide-range adjustability makes your Multipress readily adaptable to many other production needs. Get full details on the new 1-to-35-ton Multipress line today. Mail the coupon!

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EVERY C. ADAMS, vice-president, Portsmouth Steel Corp.

PERSONALS

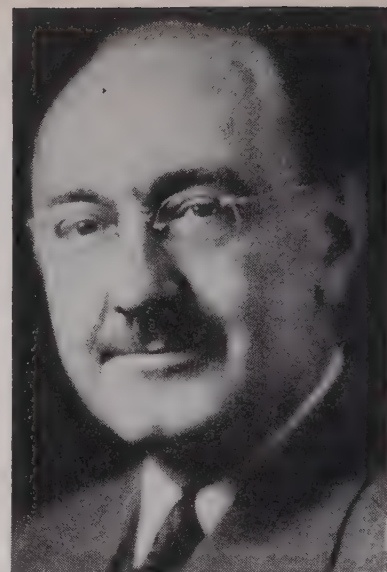
o o o

• **Carl F. Roby** has been named to the board of directors of the Cincinnati Milling Machine Co., Cincinnati. **Swan E. Bergstrom** has been elected vice-president. Mr. Roby had been vice-president of the company and Mr. Bergstrom had been sales manager.

• **Merrill J. Sahli** has been appointed acting superintendent of the sheet mill of the Torrance, Calif. plant of Columbia Steel Co., succeeding **C. B. Gray** who died recently. Mr. Sahli has been with Columbia since 1924 when he started at the Pittsburg, Calif. plant.

• **Seward T. Salvage** has been made sales promotion manager of the Timken Roller Bearing Co., Canton, Ohio, with headquarters there. Mr. Salvage had formerly served as assistant district manager of industrial bearing sales in the Cleveland office. He joined the company in 1933. **T. F. Rose**, Cincinnati branch manager of Timken's service sales division, has become manager of Timken Roller Bearing Service and Sales Ltd., Toronto, Ontario, succeeding **C. E. Webster**, deceased, who had served as manager of the Timken Canadian subsidiary since 1930. Mr. Rose has been with the company since 1924. **H. C. Telford**, assistant manager of the Timken branch in Atlanta, becomes the new Cincinnati manager. Mr. Telford joined the Atlanta staff of the company in 1928.

• **Howard Cross** has been appointed sales representative in the southern Illinois territory, St. Louis branch, Inland Steel Products Co., Milwaukee. **Robert Ladewig** has been appointed to the south St. Louis territory and **Larry Sitton** to the north St. Louis territory of the company as sales representatives. Mr. Cross and Mr. Sitton joined Inland in 1948. Mr. Ladewig has been with Inland since 1947.



GEORGE V. SLOTTMAN, director of research and engineering, Air Reduction Co., Inc.

• **George V. Slottman** has been appointed director of research and engineering for Air Reduction Co., Inc., New York. Dr. Slottman, who joined Air Reduction in 1934, was appointed technical assistant to the vice-president in charge of sales in 1948, a position he held until his new appointment.

• **Courtney Burton** has been elected a director, Oglebay, Norton & Co., Cleveland. **Harrie S. Taylor** has been elected a vice-president. Mr. Burton is president and a director of E. W. Oglebay Co. and Richwood Sewall Coal Co. Mr. Taylor has served the company as general counsel since 1936, later becoming general manager of the company's mining operations.

• **David Conte** has been appointed office manager of the Plainfield plant of the David Smith Steel Co., South Plainfield, N. J., and transferred from the Brooklyn office of the Smith Co. to the Plainfield Steel Service plant. He has been with the company three years.

• **Leyshon W. Townsend** has accepted the post of assistant to the president of American Cladmetals Co., Carnegie, Pa. Mr. Townsend had been connected with Lukens Steel Co. and until he resigned recently, had been manager of the composite steel division of Jessop Steel Co. Mr. Townsend continues as a director of Composite Steels, Inc., doing consultant work with that firm.

• **Avery C. Adams** has been elected a vice-president of the Portsmouth Steel Corp., Portsmouth, Ohio. Mr. Adams started his career in the steel business as a laborer with the Trumbull Steel Co., serving in various capacities until the company was acquired by Republic Steel Corp., when he became sales manager in the tinplate sheet division of Republic. Since 1928 he has been vice-president and director of General Fireproofing Co.; sales manager in the sheet division of Carnegie-Illinois Steel Corp.; a vice-president of Inland Steel Co., and a vice-president in charge of sales and director of U. S. Steel Corp. In 1945 he joined Charles A. Koons & Co. in an executive capacity.

• **B. John Heiser** has been elected president of the Central Ohio Steel Products Co., Gallon, Ohio, succeeding **Gilbert L. Stiefel**, who died. Mr. Heiser has been with the company since 1926 and has served as vice-president for the past 11 years and as a director for the past four years.

• **Ernest R. Bear**, vice-president in charge of the Philadelphia office of Turner Construction Co., has been named a director to succeed **Ben Moreell**, who has resigned.

• **M. A. Edwards** has been appointed assistant to the president of the Matlow Corp., Syracuse. He had formerly been associated with the Crucible Steel Co. of America.



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Circle B Bolts and Nuts...both standard and special...are manufactured on the latest precision machinery. They are held to close tolerances that assure easy installation and dependable service.

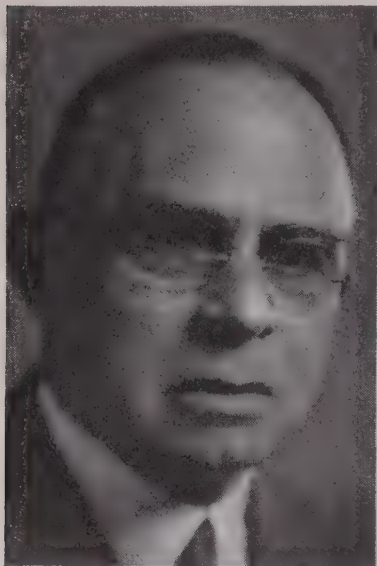
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JOHN F. THOMPSON, president International Nickel Co. of Canada, Ltd.

• **John F. Thompson**, executive vice-president and a director and member of the executive committee of the International Nickel Co. of Canada, Ltd., has become president, succeeding **Robert C. Stanley**, who continues as chairman of the board. **Paul D. Merica**, vice-president and a director, has been made executive vice-president. **Henry S. Wingate**, secretary and a director, has become a vice-president and continues as secretary.

• **D. R. Lindley** has been appointed Indiana sales representative for industrial fasteners **Oliver Iron & Steel Corp.**, Pittsburgh. Mr. Lindley has his headquarters in Indianapolis.

• **Gerald Hulett** has been named director of sales of the appliance division of **F. L. Jacobs Co.**, Detroit. Mr. Hulett had formerly been associated with **Electromaster, Inc.**, and **Bendix Home Appliances**.

• **Robert G. Fries**, **George Brannick, Jr.**, and **John B. Riddle** have been appointed to the technical staff of **Sterling Grinding Wheel division**, **Cleveland Quarries Co.**, Tiffin, Ohio. Messrs. Fries and Brannick have joined the laboratory and Mr. Riddle, who had formerly been associated with the **Ford Motor Co.**, has assumed the duties of plant engineer. Mr. Fries had formerly been connected with the **Carborundum Co.** and Mr. Brannick was with **Continental Diamond Fibre Co.**

• **William J. Mays** has been elected vice-president and **H. Douglas Chisholm**, secretary, **Cordley & Hayes**, New York. Mr. Chisholm succeeds Mr. Mays as secretary and purchasing agent, continuing as controller.

• **Austin J. Lease** has been appointed assistant superintendent of the cold drawn bar department, **Brier Hill plant**, **Youngstown Sheet & Tube Co.**, Youngstown. Mr. Lease joined the company in 1945 and in 1947 was made metallurgist at the Brier Hill works.

• **C. H. Bartlett** has been appointed manager of power transformer sales of the **Transformer Div.**, at **Sharon, Pa.**, **Westinghouse Electric Corp.**, Pittsburgh. **J. A. Schultz** has been made purchasing agent for the new **Atomic Power Div.** of the corporation. **Robert J. Seybold** has been appointed assistant purchasing agent of the **Transformer Div.** at Sharon.

• **R. J. Ryan** has been named executive vice-president, **S. C. Tracy**, vice-president and treasurer and **Herbert H. Koch**, secretary of **John Nooter Boiler Works Co.**, St. Louis. **H. A. Frith**, newly-elected vice-president, continues also as plant superintendent.

• **John M. Dolan** has been appointed vice-president in charge of sales, the **Hydraulic Press Mfg. Co.**, Mount Gilead, Ohio. Mr. Dolan formerly served as vice-president (sales), of the **LeRoi Co.**, Milwaukee.

• **Lloyd F. Hillring** has been named export engineer for the **Studebaker Corp.**, succeeding **Thomas L. Cowles**, who has retired. Mr. Hillring has been associated with Studebaker since 1927. He has served as assistant standards engineer and assistant export engineer.

• **J. C. Macon, Jr.**, assistant sales manager of the **Tar Products Div.**, **Koppers Co., Inc.**, Pittsburgh, has been named sales manager of the division. Mr. Macon succeeds **R. R. Holmes**, who has recently been named assistant general manager of the division. Mr. Macon has been with Koppers since 1935.



LYLE H. HARVEY, executive vice-president and general manager, Parsons Corp.

• **Lyle H. Harvey** has been elected executive vice-president and general manager of the newly-formed **Parsons Corp.**, Detroit, Mich. Mr. Harvey had formerly served as director and treasurer of the **Parsons Co.** and treasurer of **Parsons Industries**. **Thorsten Benton**, formerly vice-president of **Parsons Industries**, has been made secretary of the new corporation and manager of operations at **Traverse City**, where **Lyman Hermanson** has been made production superintendent in the **Appliance Division** and **James Van Wack**, purchasing agent; **Adrian G. Weaver**, production superintendent in the **aircraft division** and **Frank L. Stulen**, director of research and development. **Elmer C. Rumley** has been named manager of operations, **Fred Schmidt**, factory manager, **Harold E. Nofz**, sales manager and **Willard Brown**, purchasing agent in the **Automotive division**.

• **M. L. VanDagens** has been appointed technical service manager of **Plymouth Motor Corp.**, Detroit. Mr. VanDagens joined the **Chrysler Corp.** in 1935.

• **Melville Morris** has been appointed executive vice-president and a member of the board of directors of **Optimus Equipment Co.**, Matawan, N. J. **A. Otto Millen** has been appointed middlewest district supervisor.



EDWIN S. LEWIS, director of purchases, Donovan Wire & Iron Co.

• **Edwin S. Lewis** has been made director of purchases for the parent and subsidiary companies of the Donovan Wire & Iron Co., Toledo. Mr. Lewis had formerly been Toledo district sales manager for Jones & Laughlin Steel Corp. and prior to that served the corporation in Pittsburgh in the district and general sales departments.

• **Edward L. Hix** who has served as superintendent of the special alloys division at the Niagara Falls plant of the Electro Metallurgical Div., Union Carbide & Carbon Corp., since 1941, has been assigned to the staff of the division vice-president. **John W. Busbie**, formerly assistant superintendent of the special alloys division has been named to the position of superintendent of that division and **Alfred H. Barnes Jr.** has been assigned to the post of assistant superintendent.

• **John S. Conant** has been appointed director of procurement of Willys-Overland Motors, Toledo. Mr. Conant has served as general purchasing agent for the last six months.

• **Gilbert R. Cassidy** has joined the Bushwick Iron & Steel Co., Inc., Brooklyn, in a general sales capacity.

• **Irving A. Duffy** has been appointed director of purchasing for Ford Motor Co., Dearborn, succeeding **Albert J. Browning**, who died.

• **John G. Wood** has been appointed to the administrative staff of the general manager of the Chevrolet Motor Div., General Motors Corp., Detroit, serving as executive assistant to the general manager for engineering. He had formerly been chief engineer of Chevrolet Motor Div. **Edward H. Kelley**, assistant chief engineer, succeeds Mr. Wood as chief Chevrolet engineer. Mr. Wood joined the division in 1933.

• **Chester F. Conner** has been appointed manager of the industrial products sales department of the industrial and general products division, B. F. Goodrich Co., Akron, Ohio. **Everett C. Shingleton** has been named assistant product manager for automotive, industrial and farm services tire sales in the automotive, aviation and government division of the company, succeeding **Delmar C. Homer**, who has been transferred to the division's New York district. **Charles F. Pankey** has been named regional store manager for the Pacific Coast division of the replacement tire sales division, succeeding **W. R. Dakan**. **I. N. Kimsey** has been appointed field sales manager of the industrial products sales department. **John M. Cooney** succeeds Mr. Kimsey as manager of the Akron district for industrial products sales. Mr. Cooney had been manager of the Boston district for industrial product sales for the last two years.

• **Herbert M. Gould** has been named general manager of the Motors Holding division, General Motors Corp., Detroit. Mr. Gould, who joined the company in 1926 and who had served as assistant general manager of the division since 1936, succeeds **Albert L. Deane**, who has retired after 30 years with G. M., the last 20 as general manager of Motors Holding.

• **Albert A. Teeter** has retired from Chas. Pfizer & Co., Inc., Brooklyn, after 34 years with the company, rising from a salesman to vice-president.

• **W. N. Dawson** has been named medical director of the Tennessee operations of the Aluminum Co. of America. Dr. Dawson has served as medical director of the Alcoa fabricating works of the company since 1944.



R. J. TREMBLAY, general superintendent, Bethlehem Pacific Coast Steel Corp.

• **R. J. Tremblay** has been appointed general superintendent of the Los Angeles steel plant of Bethlehem Pacific Coast Steel Corp. Mr. Tremblay, who had previously served with Bethlehem Pacific's Seattle operation, has been assistant general superintendent at Los Angeles since 1947.

• **Leo F. Fowler** has been named factory superintendent; **George F. Brown**, master mechanic, and **Melvin S. Stern**, planning superintendent, Universal Products Co., Inc., Dearborn.

• **Charles T. Morgan** has been appointed New England sales representative of Sperry Products, Inc., Danbury, Conn. Mr. Morgan had formerly been in charge of sales and service for the Submarine Signal Co. in New England.

• **Kenneth L. Gackel** has been promoted to the post of assistant sales manager, wire and cable division, Electric Auto-Lite Co., Port Huron, Mich. Mr. Gackel has been a district supervisor in the merchandising division since 1939, when he joined Auto-Lite.

• **Ralph M. Johnson** has been named vice-president in charge of sales of the Norton Co., Worcester. He had formerly served as vice-president and general sales manager for the company's abrasive division. Mr. Johnson entered the employ of the company in 1915 as a research chemist.



LOUIS C. EDGAR, JR., president, E. W. Bliss Co., whose appointment was announced recently in *THE IRON AGE*.

• **John H. Whitney** has been elected chairman of the board of Freeport Sulphur Co., New York.

• **A. E. Ruemmele**, 59, chief engineer, Jay J. Seaver Engineers, Chicago, died Jan. 30.

• **Francis Davidson**, founder and president, Davidson Enamel Products Co., Lima, Ohio, died Jan. 25.

• **John F. Kelly, Jr.**, 57, export sales manager, Electric Storage Battery Co., Philadelphia, died Jan. 25.

• **Calvin B. Gray**, 64, superintendent of the sheet mill, Columbia Steel Co., Torrance, Calif., died Jan. 19. He had been affiliated with the U. S. Steel Corp. for more than 52 years.

• **Horace S. Gulick**, 63, assistant to the first vice-president, New York Air Brake Co., Watertown, N. Y., died recently.

• **Hugo L. Olson**, 71, president, Sundstrand Machine Tool Co., Rockford, Ill., and American Broach & Machine Co., Ann Arbor, Mich., died Jan. 31.

• **Nelson J. Kemp**, 73, owner and manager, Kemp Mfg. Co., Erie, Pa., died Feb. 4.

• **W. J. Haring** has been made technical director of the Quaker Chemical Products Corp., Conshohocken, Pa. Mr. Haring joined Quaker in 1944 as plant supervisor and became director of metals research in 1945.

• **T. C. Glenn** has been named manager of the engineering division of the newly-created Michigan district of the General Electric Co., with his headquarters in Detroit.

• **Stanley T. McFadden** has been named manager of the Albany branch of Reo Motors, Inc., Lansing, Mich. Mr. McFadden has been in the truck industry 26 years.

• **M. A. MacConnel**, formerly Detroit district manager for the U. S. Tire division of U. S. Rubber Co., has been transferred to New Orleans as district manager. **H. E. Walker**, formerly district manager at New Orleans, succeeds Mr. MacConnel in Detroit.



E. W. RISTAU, vice-president, Cummins Business Machines Corp.

• **E. W. Ristau** has been appointed vice-president in charge of sales Cummins Business Machine Corp., Chicago, directing the sales and advertising activities of the portable electric tool division.

OBITUARY...

• **George F. Simson**, 61, a sales executive, Bethlehem Steel Co., Inc., New York, died Feb. 7.

• **Henry A. Van De Motter**, 55, formerly production manager of Hope Metal Products Co., Cleveland, died Feb. 1.

• **Harry W. Beedle**, 69, retired manager of Boston branch, Electric Storage Battery Co., Philadelphia, died Feb. 3.

• **Joseph M. Usher**, 60, vice-president, Merrill & Usher Co., Worcester, died Jan. 26.

• **Edward R. Mills**, 73, retired sales manager, Ingersoll Steel Div., Borg-Warner Corp., Chicago, died recently.

• **John F. Alexander**, 60, vice-president, Signode Steel Strapping Co., Chicago, died Feb. 7. Mr. Alexander had been associated with American Steel & Wire Co. and an assistant vice-president of the U. S. Steel Corp.

• **Joseph P. Busher**, 62, manufacturers' representative for Ackermann Mfg. Co., Wheeling, W. Va., died recently.

• **Samuel W. Jull**, 61, chairman of the board, Pittsburgh Erie Steel Corp., Pittsburgh, died recently.

• **Albert Spillman**, 85, former president of Spillman Engineering Co., North Tonawanda, N. Y., and one of the organizers of the Henschell-Spillman Co., died Feb. 1.

• **Albert Strous**, 62, Strous Iron Steel Co., Ashland, Ohio, died Jan. 20.

• **Frederick W. Moffat**, 83, vice-president of Moffat Stove Co., Toronto, Canada, died recently.

• **Harry F. Bovard**, 78, president, Keystone Coal & Coke Co., Greensburg, Pa., died Feb. 2.

• **Arthur T. Waterfall**, 79, formerly president, Dodge Bros., Inc., Detroit, died Jan. 29.

• **James B. Thorpe**, 66, executive vice-president and director, Columbian Molybdenum Co., New York, died Jan. 29.

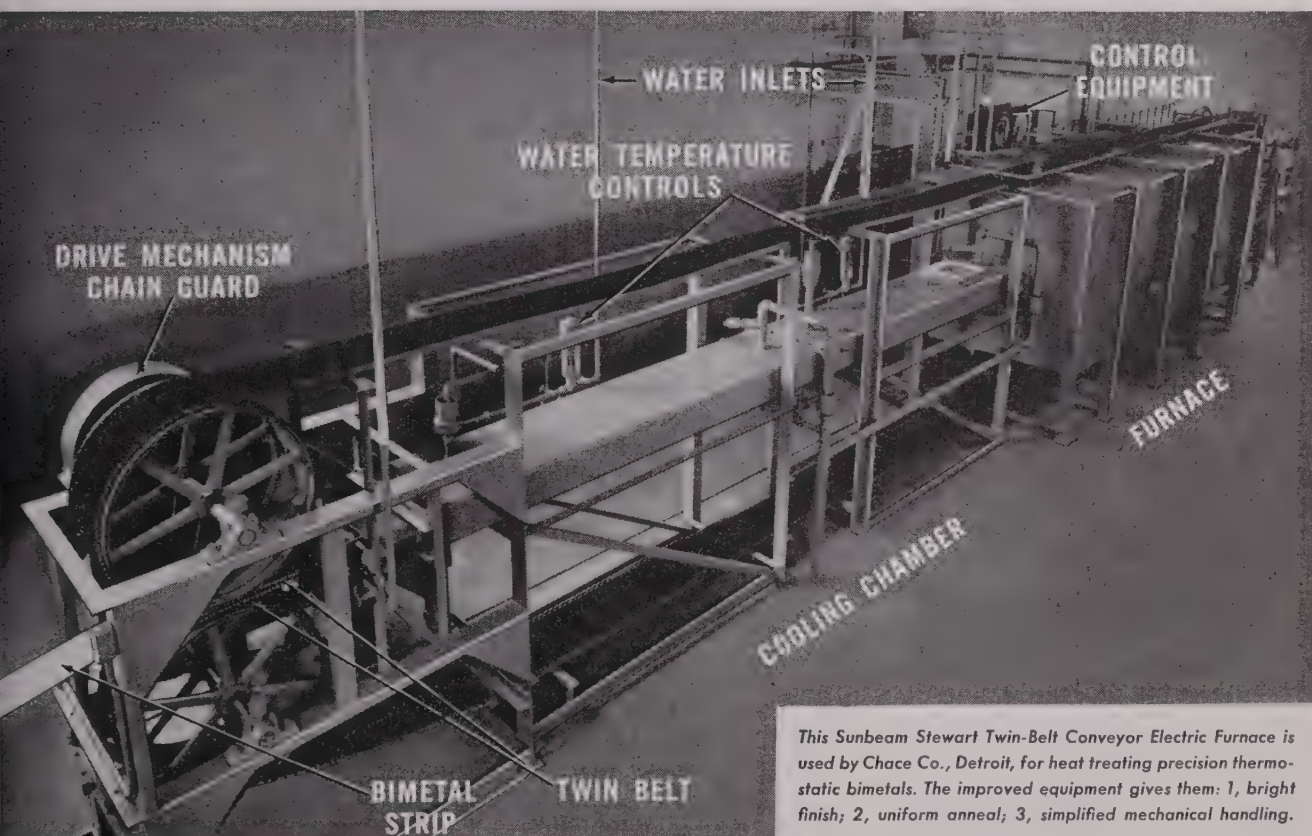
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For CONTINUOUS ANNEALING BIMETAL STRIPS

AT W. M. CHACE COMPANY, DETROIT, MICH.



This Sunbeam Stewart Twin-Belt Conveyor Electric Furnace is used by Chace Co., Detroit, for heat treating precision thermostatic bimetals. The improved equipment gives them: 1, bright finish; 2, uniform anneal; 3, simplified mechanical handling.

This is the 89th full page in a series featuring typical Sunbeam Stewart installations. These installations demonstrate the wide variety of specific requirements in the metal-working industry Sunbeam Stewart furnaces are designed to meet. Sound engineering and quality workmanship are behind this continuous record of delivered satisfaction.

To meet the heat treating requirements of Chace thermostatic bimetals which curl when heated, Sunbeam Stewart engineers developed an electric twin-belt conveyor furnace. Result: Improved the quality of the

product and reduced annealing costs from \$0.12 to \$0.02 per lb. of work processed. The capacity of the furnace is 200 lbs. per hr. The material handled is from 0.08 to 0.250 inches thick, 3" to 6" in width.

Besides being ideally suited for process-annealing thermostatic bimetals, this Sunbeam Stewart furnace design with the twin conveyor belt arrangement should prove practical for applications requiring bright annealing of non-ferrous alloy strip of various width and thickness, used in the manufacture of watch cases, compacts, etc.

It will pay to consult Sunbeam Stewart on your heat treating problems. In addition to continuous conveyor units, Sunbeam Stewart builds a full line of standard furnaces and galvanizing equipment.

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European Letter . . .

• Norway provides test case of West's diplomatic strength . . . Firmness and pertinacity only answer to Russia . . . Scandinavian governments' attempts to build northern defense union meet with difficulties.



LONDON—Sooner or later Norway was bound to be thrust into the arena of the cold war between Russia and America. The open preference of its people for the ways of the west, its bitter experiences in the war and its impatience with the wishful thinking of its neighbor Sweden had already led its Labor Government into words and acts which drew rebukes from Moscow. It was only a question of time before it declared itself for the west, and asked for its protection. The year that has passed since the Communist *coup* in Prague has seen the Communists of Norway dwindling to an insignificant minority and its public opinion rallying fast behind a policy of seeking security in cooperation with other Atlantic countries.

Norwegians are well aware of the immense strategic importance of their country. With over 1000 miles of Atlantic coastline, with Oslo less than seven hundred miles from Leningrad, with ports and airfields commanding not only the exit from the Baltic to the North Sea but also the sea route from Russia's only ice-free port to the west—Murmansk—the independence of Norway is a vital interest to all the Powers. Next to the Biscay ports those of

Norway were the most precious assets of Hitler's admirals in the Battle of the Atlantic. Its airfields have now become no less important, to the Russians as well as to the Americans. The desire of its people is that neither should be used again in a world war, and the decision of its Government is that such a war will be most probably averted by a guarantee of security from a united West. Norway sees that it cannot stand alone in the no-man's-land between the Atlantic and Russia.

THIS calm and bold decision has split opinion in the neighboring countries of Denmark and Sweden, both Baltic rather than Atlantic powers, and more vulnerable than Norway to penetration from the east, both tempted by the idea of armed neutrality. Having spent a considerable sum on armaments and trained an army of 600,000 men, Swedish politicians and soldiers have argued that Sweden could defend itself and its neighbors against attack for six months—long enough for others to come to their aid. Norwegian and Danish experts reduce the six months to six days, and argue that, if defense plans count in any case on eventual help from the west, why not take steps to see that the help is arranged in advance?

Because of such differences in their hopes and fears, the efforts of the three Scandinavian govern-

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ments to build a northern defense union have met fundamental difficulties from the first. From October to January the struggle for agreement went on, even to the point where Sweden agreed to give up its neutrality and to join, as the dominant member, the defensive triple alliance known as the Karlstad plan. This alliance was to be regarded as a regional arrangement under the United Nations charter—like the Western Union and the Atlantic Pacts. But this

patiently erected structure tottered when Norway and Denmark insisted that it must be based, like the Brussels Pact, on two firm assurances: first, that the alliance would be acceptable to the United States and Great Britain; second that military supplies would be available from across the Atlantic. It collapsed partly because the Swedish Government felt that such conditions were contrary to their idea of an armed neutral bloc, round which the waves of conflict might storm harmlessly; partly because it was blown over by a gust from Washington. A public statement from the State Department said that the United States would supply arms and equipment only to governments cooperating in its security system. That brought the Karlstad Plan crashing to the ground: Norway would not take part without help from the West; Sweden would not take part if the Atlantic Pact were involved.

THIS American attempt to strengthen Norway's hand—an ill-timed and ill-considered move—was followed by a menacing but not unjustified inquiry from Moscow to Oslo. What, it asked, was Norway's attitude to the Atlantic Pact, that "instrument of aggression and imperialism"? Would Norway be undertaking any obligation in respect of the creation of air force or naval bases on its territory? The Note of January 29 suggested that the stretch of common frontier in the northern snows of Finmark gave Moscow a special interest in what was going on. In fact, Norway had received no invitation to join the Atlantic Pact, and had so far been involved in no commitments by American diplomacy, which was presumably well aware that Norwegian public opinion needed no persuading to look westward for its security. The Norwegian Government's reply three days later was therefore written with a clear conscience. They did not know, just as public opinion in the United States and Europe does not

know, what commitments members of the Atlantic Pact will incur. They therefore explained to the Russians that they had still to investigate more closely in what form and what conditions they could take part in such a security system. They also gave an assurance that they would have nothing to do with a policy with aggressive aims, and would never undertake to grant bases to foreign Powers as long as Norway is not attacked or subjected to threats of attack. Whereupon Moscow came back with the offer of a pact of nonaggression, still breathing suspicion of the Atlantic Pact but rather more conciliatory in tone.

By this time the diplomatic situation had become somewhat absurd, in spite of the gravity of the issue. Everyone was arguing about a treaty that did not exist and the essential points of which were unknown. For all the Norwegian Government knew it might have been excluding itself from membership of the Atlantic Pact by promising the Russians that it would not grant bases until threatened with attack. It has been assumed in the past that the Atlantic Pact would in fact bind its members to join defense arrangements of the kind in which the common use of certain bases, or their denial to enemy, is taken for granted. It now seems possible that views have changed, that countries that stand on the edge of the Russian *cordon sanitaire* will undertake less risky commitments to the United States than those already incurred by Denmark in Greenland or by Turkey. The visit of the Norwegian Foreign Minister to Washington this week should have cleared up this and other points; in fact, it looks as if more will be known about the Atlantic Pact as a result of the Norwegian inquiry than might otherwise have been available for some weeks. As has happened so often in the past, the Russian intervention will have crystallized ideas which were getting rather confused and hastened action which was getting rather leisurely.

THE outstanding fact in the cold war now is that Norway will certainly reject the Russian offer of a pact of nonaggression, and will stand alone in doing so, with no Atlantic Pact completed and the Karlstad plan in ruins. Moscow is

likely to soon face a pretty dilemma. It has probed one part of the western diplomatic front with a news agency message of peace and has been repulsed. It has probed another part with a diplomatic message of displeasure. That, too, is likely to be repulsed. If it decides that Norway offers the bitter opening it may press harder for success. By doing so it would certainly run into a solid wall of public resistance in Norway and would probably drive Sweden farther away from the position of neutrality which it has begun to abandon. In that case Denmark would almost certainly follow Norway.

At first sight the prospect seems, from the western point of view, not unpromising. Whatever Russia's next diplomatic move may be (and it is reasonable to assume that there will be nothing more so far as Norway is concerned) the determination to establish the Atlantic security system will harden. For Norway provides a test case of the West's diplomatic strength, the handling of which will be watched anxiously by Italy and by other countries which have either been mentioned as probable members of the pact, or which are already sheltering under the American umbrella. But second thoughts make it clear that such a test was not desired in Washington, at any rate at this stage, and that the State Department is faced with a question of the greatest difficulty—a question which the role of the United States in Europe was bound to raise sooner or later. The Norwegian Foreign Minister is reported to have asked what protection the United States can offer during the period in which the Atlantic Pact is being drafted, agreed and presented to the Senate. Strictly speaking the President can offer none; to do so in hard and fast terms would be to go beyond his constitutional powers. It seems unlikely that he can do more than refer Mr. Lange to the several public statements he has made since the spring of 1947, declaring the determination of the United States to protect free peoples. In March, 1947, President Truman told a joint session of Congress, summoned to hear of the plight of Greece, that "it must be the policy of the United States to support free peoples who are resisting attempted subjugation

by armed minorities or outside pressure." If that is not good enough for Mr. Lange it should certainly be enough to keep Mr. Molotov's next moves within diplomatic limits.

THE whole story throws a vivid light on the difficulties which face Mr. Acheson in carrying on the containment policy laid down by Mr. Marshall, once it is applied at the fringes of the Russian sphere of interest. They account for the signs of hesitation which Washington has shown this week. Yet the history of the last two years has shown again and again that firmness and pertinacity are the only answer to Russian diplomacy as practiced since the war. The question now is whether the same firmness and pertinacity are to be applied to actual and potential allies. Is the State Department going to reverse its decision to send no military supplies to countries outside the American security system? It would be unwise to do so, for what supplies there are, and they are far from adequate for immediate use, should be concentrated not dispersed. It would be foolish to disperse either the political strength or the military resources of the associated western Powers, either by inviting too many governments into the Atlantic Pact or by offering aid to all comers. Likewise it would be shortsighted to draft a pact so general that the faint-hearted and the opportunists would be clamoring to join it.

The Atlantic Pact, whatever its content and scope, will provoke Russian suspicion and alarm. Nothing will be gained by leaving uncertain what it demands of its signatories. In fact it will not fulfill its purpose unless it provides a genuine and overwhelming deterrent to aggression in Europe. If it is to be nothing but a political gesture without military capacity behind it it will invite the one thing which might plunge Europe into war—an attempt by the Russians, when they feel strong enough, to call the western bluff. The case of Norway is a warning against the hopeful belief that the cold war can be fought without real risks, real defense measures, and real undertakings between allies. It has caught Washington taking a rest between rounds, and that is dangerous.

• **CONVERSION COSTS DIP**—One large Eastern mill has lowered its conversion charge by \$6.50 a net ton. Their present price to convert slabs into hot rolled sheets is \$25.00 per net ton, and is figured on the slab weight. Other conversion charges around the country remain unchanged. One company in Ohio charges \$20.00 per net ton figured on the finished sheet weight. A large Pittsburgh concern charges on the average of \$15.00 to \$20.00 per ton. A large Chicago mill has a different arrangement. This has been in effect for some time and remains unchanged. This company pays \$37.50 a net ton for ingots and bills the customer for the hot rolled bands at the mill price. In processing slabs, this mill pays \$44.00 and rebills again at mill price. Eastern mills usually allow the customer a credit for the scrap generated, which the mills keep. The Chicago mill keeps the scrap, but makes no rebate for it.

• **JAPAN OFFERS**—Manganese, iron ore, raw or dead-burned magnesite and pig iron are available for purchase from Japan by American firms, the Office of International Trade announced this week. Japanese Board of Trade is soliciting f.o.b. and c.i.f. offers for these critical materials. American purchasers will be required to establish a 20 pct performance bond before contracts can be concluded, the OIT said. The OIT said it has no information at present on the closing date for submission of offers or on the quantities of these materials available for purchase.

• **COPPER TAX**—The House Ways and Means Committee has favorably reported a bill (H. R. 2313) to suspend the import tax on copper for another 2 years. The bill as introduced by Representative Mills, D., Ark., continued the suspension of the tax for one year. Members of the committee voted to extend the suspension period until Apr. 1, 1951.

• **HIGHEST PAYROLL**—The annual payroll of the iron and steel industry exceeded \$2 billion for the first time in 1948, and was 200 pct higher than the 1935-39 average, according to the American Iron and Steel Institute. The estimated total was \$2,234,461,000, an increase of more than 12 pct over the previous record year, 1947. At the end of 1948, payments to workers receiving wages were averaging \$1.63 an hour compared with 84¢ in 1939. The number of wage workers increased from an average of 425,100 in 1939 to 541,000 in 1948.

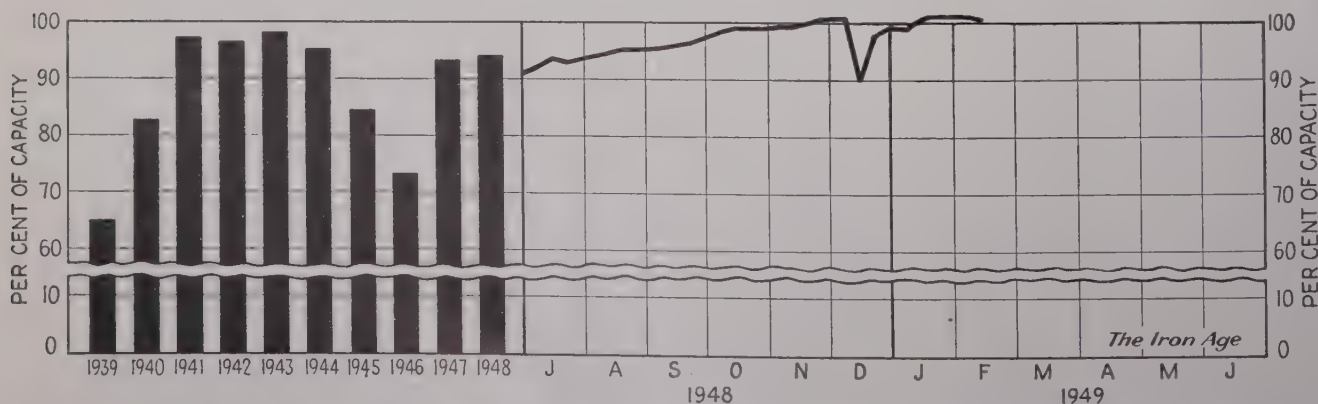
• **STEEL EASING**—Secretary of Commerce Sawyer said last week that shortages in many types of steel products are expected to continue through 1949, but the over-all steel shortage may well be eased materially. Appearing before the Senate-House Committee on the Economic Report, Mr. Sawyer backed up President Truman's recent proposal on steel capacity study and expansion. His outlook for easier steel was based on the industry's hope of increasing output from 88,200,000 tons in 1948 to 93 million tons in 1949 and more than 95 million in 1950.

• **COKE RECORD**—Production of coke in the U. S. in 1948 reached a new all-time high of 74,337,683 tons. This was an increase of 1.2 pct over 1947 according to the Bureau of Mines U. S. Dept. of Interior. Output from beehive coke ovens decreased 5.1 pct from 1947, principally because of work stoppages in the bituminous coal industry during the Spring and Summer. But this decline was more than offset by an increase of 1.8 pct in oven coke output. A breakdown by principal uses indicates that in 1948 79.7 pct of all coke shipped from coke ovens moved to iron blast furnaces, 5.1 pct to foundry cupolas, 6.4 pct for the manufacture of producer gas and water gas, 3.8 pct for other industrial use, 4.4 pct for domestic heating, and 0.6 pct was exported.

• **OUT OF BLAST**—The Tennessee Coal, Iron & Railroad Co. is taking out of production its No. 7 blast furnace at Fairfield Steel Works, Birmingham, for relining, overhauling and enlarging. The furnace, one of nine operated by the company, will have capacity increased from 1025 tons daily to 1175 tons. Hearth diameter will be increased from 25 to 27 ft 3 in. The work is expected to require about 65 days for completion. The furnace was placed in production April 29, 1942 and has produced 2,485,000 tons of iron since then.

• **GEARING GAUGE**—Orders reported by the gearing industry during 1948 were 9.51 pct higher than in 1947, according to American Gear Manufacturers Assn. Open gearing bookings were 4.86 pct higher, while bookings for enclosed gear drives increased 14.6 pct. Shipments of all gearing products were up 10.31 pct from the previous year. Open gearing shipments increased 8.98 pct, while enclosed gear drive shipments were 11.52 pct higher.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
February 8	101.0	101.0	94.0	101.0	102.5*	105.0	100.0	103.0	108.0*	102.5	107.0	89.5	112.5	100.5
February 15	101.0	99.0	94.0	101.0	102.0	105.0	99.5	101.0	102.0	103.0	107.0	89.5	94.0	100.0

* Revised.

- **Production Shatters All-Time Records**
- **Carbon Steel Market Under Scrutiny**
- **Steelmakers Will Not Guess Past June**

RECORD breaking steel production continues to make news this week. For the fifth consecutive week the operating rate has been at 100 pct of rated capacity—or more. Also for the fifth consecutive week steel output has been at an annual rate of more than 97 million tons.

But this tells only part of the story. Since the first of the year the operating rate has not been below 98 pct of rated capacity. New all-time weekly production records have been established, only to be broken on following weeks. The month of January was an all-time high, too—more than 8 million tons of ingots and steel for castings. This week's operating rate of 100 pct of capacity indicates that the first quarter will probably also be an all-time record for production of steel.

Every week the industry continues this tremendous production pace it moves the market factors of supply and demand nearer to the point of balance. Some people inside and outside the steel industry are beginning to wonder what will happen when that precarious point is reached—possibly during this year. Results of the high output already seen are: (1) Almost complete reduction of the potency of the gray market, (2) consumers' cancellations and growing hesitancy to extend conversion deals, (3) cancellations by some lines of consumers of existing regular mill orders, and (4) increased offerings of bonus tonnages by mills because of spot cancellations.

In spite of all these straws in the wind steelmakers are not worried this week. Demand is still good. Steel makers believe: (1) That steel business will be good this year, and (2) that there will be further easing in demand for carbon steel as there has already been for alloy, stainless and tool steels.

What they don't know is when carbon steel supply will balance demand. To guide their thinking they have some signs. Their customers' customers are getting cautious, inventory conscious and to some extent, price conscious.

BUYERS had previously been ordering and planning their steel needs for months ahead. They felt they could order steel, certain in the knowledge that orders for fabricated parts would be forthcoming. Until recently they've been almost 100 pct right. But now some of the people who buy fabricated steel products have been deferring their orders. This leads to cancellation or deferment of steel orders. So far these cancellations have had no effect on the total tonnages scheduled for production at the mill level.

But cancellations in certain products have

been substantial. Initial offers of extra alloy tonnages were first met with happy smiles by steel buyers. The smiles turned sour when they checked with their customers and found an increasing tendency to dig into inventories until they could get a clearer picture of business ahead. They are still viewing the "critical months."

Carbon steel buyers are not in this class at all. Demand for almost all carbon steel products still tops supply. Although a few buyers have canceled or declined to accept quotas, others are still anxious to take all tonnage available. Freight car builders, most of whom are short of orders, are refusing some tonnage, but the mills are having no trouble disposing of it elsewhere.

Buyers are still putting plenty of pressure on steel sales officials for carbon sheets and strip, plate, structurals and a few other products. Steel men can't say now when they'll be able to deliver the tonnages many of these buyers want. Yet they realize they might be the last to know if demand falls off. It starts at the consumer level and works back.

STEEL people believe the next 60 days will answer a lot of questions on demand. Meanwhile, production plans now being made by some companies contemplate capacity operations into June. They don't say June will be the turning point, they simply are unwilling to guess too far ahead.

Alert steel companies are already preparing for the buyer's market. They plan to go after business by emphasizing things which have been neglected since before the war. These include: (1) Training of salesmen, (2) training of management, (3) more emphasis on costs and efficiency, and (4) new products and processes to make them more competitive.

Many of the nation's steel company executives have no experience in a buyers market. The day when a carload of steel had to be rushed out on 24-hr notice to keep a good customer happy will be new to them. Now, while there is time, they are beginning to familiarize themselves with the technique of doing business when the customer is boss. And a lot of customers are quietly licking their chops—waiting for the great day.

Although there was no change in THE IRON AGE scrap composite price this week, that market continues wobbly. Cast grades and railroad specialties continued their downward flight. No one is willing to predict when, or on what level, this market will stabilize.



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WASHINGTON STEEL CORPORATION
WASHINGTON, PENNSYLVANIA

Freight Car Program Doomed Unless New Orders Are Placed Soon

Chicago

• • • Unless more freight cars are ordered in the next 30 to 60 days, the whole car building program will collapse before summer. Independent car builders are short of orders and will complete their schedules based on present backlogs in May, June and July, depending on type of cars and the particular company involved.

Should the car building program collapse the steel allocations will also go by the board. Steel executives already are wondering whether they should continue to ship all of the 250,000 net tons per month allocated to meet the 10,000 car a month car building program.

Steel allocations at present, railroads and car builders told THE IRON AGE, are more than ample to meet demand. At the last meeting of the ODT and the Steel Advisory Committee they only allocated tonnages for April, as May steel would mean July cars and the building schedules were too much in question to rationally allocate steel shipments in May.

The ODT told THE IRON AGE that it appears they are going to have to channel more steel into railroad shops than the independent car building shops as the railroad shops have longer backlogs, some as much as 2 years. Numerically, the car builders have bigger backlogs but their productive capacity is so much greater than the railroad shops that they will clean up their orders long before the shops complete their own building programs.

The freight car shortage, as far as the railroads are concerned, is over. New car orders have been very light in recent months. In January only 1568 cars were ordered. Railroads have experienced decreasing carloadings. Car prices are high and whenever possible the railroads are building their own cars.

Total backlog of orders as of Feb. 1, according to the American Railway Car Institute, totaled 96,214 cars. Of this the car build-

New Car Orders Have Fallen Off; But ODT Still Asks Bigger Building Plans

By D. I. BROWN
Chicago Regional Editor

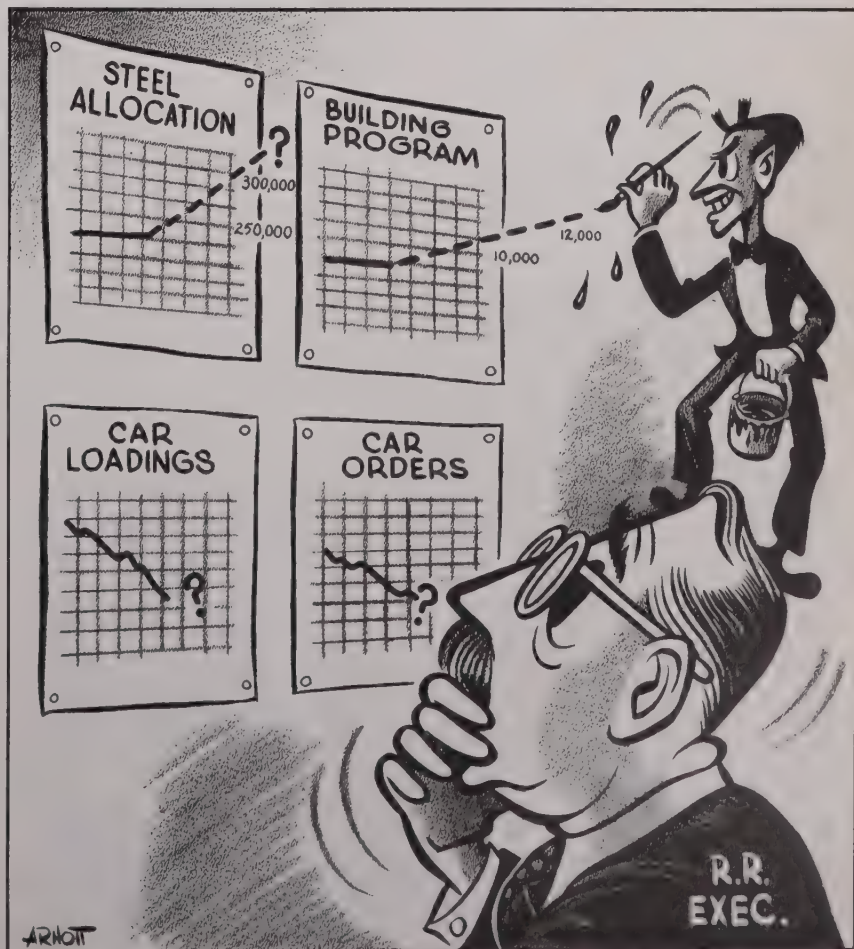
ers will build 59,984, while the railroad shops have on order 36,230. This total compares with 119,711 cars at the same time last year. Historically, the car builders have built 80 pct of the new cars with the railroad shops building the balance. Today, the car

builders only hold about 60 pct of the new orders.

Bad order cars, cars in need of repair, are a little higher than they were a year ago. Jan. 1, 1948, showed 71,636 or 4.3 pct of the total cars owned by Class I railroads as bad order. The same date this year showed 80,241 cars or 4.7 pct of the total ownership by Class I roads in need of repair.

Western railroads say that they have plenty of steel to meet their car building programs and for the most part they do not want their monthly allocated tonnages increased. Their car building shops are operating at capacity and plenty of steel is available to repair cars if they want to. Because of the decrease in carloadings,

What Gives?



the railroads have been setting aside many of their cars and will not use them or repair them again until carloadings pick up.

Many of the cars in use today are over-age and the railroads agree even at a 12,000 car per month building program it would take at least 5 years to replace these cars. However, they see no need of further replacement, in view of present business conditions. The Pennsylvania Railroad, for instance, owns 220,480 freight cars. Of these some 133,900 cars are at least 30 years old.

A Pennsylvania spokesman told THE IRON AGE that their freight car ownership is well above the national average and thousands of the over-age cars would have been scrapped if World War II hadn't required that they be kept in service. They are now scrapping them as fast as they can. Mr. Buford, president of the Milwaukee Road, said that he considers their ownership of cars also above average and that in the past 2 years since the war they have built approximately 12,000 cars and when they complete their building schedule at the end of 1949, very few more cars will be built unless conditions are vastly different than they are now.

Despite the fact that the roads say they don't need many more cars than they have, they will be satisfied when present building schedules are completed, and that they regard the freight car short-

age as over, the ODT in Washington is still yelling for more cars. Robert Glen of ODT told THE IRON AGE that they want 40,000 box cars and 60,000 open cars built in 1949. Mr. Glen said they regard this as a mandatory building schedule. The ODT feels a 2 million freight car pool is the minimum safe requirement for adequate defense. He said further that if the railroads do not order the cars the government will. This is big important talk. The hitch is, who will authorize the ODT to order the cars? Who will pay for them and who will own them? The western railroads told THE IRON AGE they have no intention of being forced to buy cars which they feel they will not need.

Railroad executives in Chicago pointed out that the industry actually needs fewer cars in wartime to move the same tonnage than they do in peacetime. Heavy volume movements during wartime to a selected number of destinations, plus maximum length trains of cars each carrying maximum loads both going and coming, decreases the number of cars and locomotives needed for wartime movements.

The steel mills know the car builders are short of orders. They say that if the major tonnages are shifted to the railroad shops after the car builders clean up present orders in June and July, the railroads will soon catch up—if their car output can be stepped up. In

most cases they know the railroad shops are working at capacity and, therefore, some steel executives expect allocated tonnages to this industry to be drastically cut in June or July unless large new orders for cars are placed promptly.

Already a change in product mix to this industry has taken place. In the March allocations sheet tonnages were cut and plate tonnages were increased because most of the box car requirements have been fulfilled and the emphasis is now on gondolas and hopper cars which require plates instead of sheets.

ODT will continue to push the 10,000 car per month building program. They insist they still want the schedule increased to 12,000 cars per month. Their threat of government financed and government owned cars is not taken seriously by the railroads centered in Chicago. Present indications are that, if Col. Johnson and the ODT continue their push for more car production, they are destined to fall flat on their faces unless the government actually authorizes a car program of its own.

To Build Soybean Plant

Pittsburgh

• • • Chemical Plants Div., Blaw-Knox Co., has received a \$750,000 contract from Soyafeed & Oil Corp., E. St. Louis, Ill., to design and build a 200-ton per day soybean extraction plant.

Process equipment will include: three Lewis flaking mills, one vapor desolventizer, one pressure toaster and one deodorizer, in addition to an extractor of new design. Hexane will be the solvent.

Claim Change-Over Record

Detroit

• • • Plymouth Div. of Chrysler Corp. is believed to have established a new record for efficiency in changing over to its new models. The plan used by Plymouth was to transfer employees on the No. 1 line and run a 2-shaft operation on the No. 2 line. The process was reversed in converting the No. 2 line over to 1949 model production.

POWDER CUTTING PROCESS: The operator is using an Oxweld AC-4 powder cutting blowpipe to cut 10-gage 18-8 stainless steel at the rate of 12 in. per min. In this process an iron rich powder is automatically injected into the cutting-oxygen stream. Quality of the cut compares favorably with those obtained in plain oxy-acetylene cutting of carbon steels.



Warehouses, Consumers On Atlantic Coast Flooded With Foreign Steel Offers

By JOHN ANTHONY
Eastern Regional Editor

Philadelphia

••• Offerings of foreign steel products have grown to very significant proportions along the Atlantic Seaboard in the last few months. Steel warehouses and consumers are being flooded with offers of heavy tonnages of steel ready for immediate delivery. One observer places the tonnage at upwards of a million tons offered during a 30-day period. As much as 10,000 tons a day is offered with car numbers to be furnished a day after the receipt of the order.

Import tonnages began to increase sharply about 6 months ago. October imports, 22,282 tons according to Dept. of Commerce statistics, were more than double the September tonnage. November imports, the latest figures released, were 25,087 tons, nearly five times heavier than in July. Imports in 1947 ranged from 1000 to 4000 tons a month. Reports in the trade indicate that December and January tonnages will be even heavier. The receipts in December of one eastern jobber alone totaled 8000 tons.

Offerings are principally of small shapes, structurals, beams, channels and angles, columns, flats and rounds, deformed bars, and hot-rolled bars and strip. Prices are reported to be well below the gray market, about the same prices in carload lots as domestic warehouse steel. Angles, for example, 1-in. x 1½ in. are offered at 6.00¢ to 6.75¢ per lb. There is practically no plate or sheet tonnage being offered. Some galvanized sheets have come in from the United Kingdom. There was also a small tonnage of ⅜-in. plates offered at 7.50¢ per lb.

There are four jobbers in the Philadelphia area with substantial stocks of foreign steel, estimated at 50,000 tons. More than 50 New York jobbers are offering a total tonnage estimated at 250,000 tons. One jobber in Knoxville, Tenn. shows about 100,000 tons in its list of offerings, and claims to have 250,000 tons of steel on hand.

The steel imports come principally from Belgium, Luxembourg

and France. They reflect the improved production facilities and raw materials position of European producers in 1948. Belgian production improved 74 pct in 1948; Luxembourg, 63 pct; and France and the Saar, 75 pct. Steel shipments are being carried on the return trip of vessels which would otherwise be in ballast.

The principal imports of steel products during the 11 month period to the end of November as reported by the Dept. of Commerce were as follows: structural shapes, 30,423 tons, principally from Belgium-Luxembourg; plates, 16,158 tons, from the U.K., Belgium-Luxembourg, Canada; ingots, blooms and slabs, 15,223 tons, Canada; black sheets, 5363 tons, Belgium-Luxembourg, Canada; other sheets and plates, 1676 tons, Canada; rails, 4614 tons, Canada; wire rods, 5584 tons, Sweden; strip, 3494 tons, Sweden, Belgium-Luxembourg; bars 3122 tons, Canada, Belgium-Luxembourg.

These figures fail to reflect the sharply accelerating rate of imports as indicated by the table of monthly receipts which follows. But still larger tonnages are expected to appear in 1949 receipts.

U. S. Imports of Steel Products
(net tons)

	1948	1947
July	5,302	3,939
August	8,562	2,149
September	10,326	1,098
October	22,282	2,196
November	25,087	1,196

These figures include such semi-finished steel products as ingots, blooms and slabs, and wire bars, but their tonnages have remained fairly constant. On the other hand there have been very significant increases in tonnages of structurals, plate, strip and bars in the last few months reported.

Steel imports from western Europe are as yet only a small proportion of the tonnages exported to those countries. Export licenses granted in 1948 for shipment of steel to western European countries were as follows: First quarter, 407,459 tons; second quarter, 339,340 tons; third quarter, 280,910 tons.

COAL PREPARATION PLANT: Shown in an aerial view is the \$12 million Jones & Laughlin Steel Corp. coal preparation plant at East Fredericktown, Pa. The plant which is scheduled for completion by midsummer will process 2000 tons of coal an hr, separating it from low grade material, sizing it and then transferring the high grade coking coal as well as steam coal to river barges. (See THE IRON AGE, Sept. 10, 1948, p. 110.)



Industrial Briefs . . .

• **RENTAL POLICY**—Nelson Stud Welding Div. of Morton Gregory Corp., Lorain, Ohio, has announced that its stud welding equipment can now be obtained on a rental basis. The lightweight stud welding gun, automatic control unit and necessary welding cables can be had for a fixed monthly rental of \$45.

• **OPENS BRANCH OFFICE**—Gits Bros. Mfg. Co., Chicago, manufacturers of lubricating devices and shaft seals, has appointed Frank A. Kovarik, general sales manager, to establish and manage the new Michigan branch office in Ludington.

• **MOVING PLANT**—Sharon Steel Corp. has announced that it is moving its Telopost Corp. plant from Akron to Farrell, Pa. Telopost makes metal posts to prevent floors from sagging. It also plans to produce heavier permanent steel cellar supports.

• **PURCHASE**—The Cleveland Crane & Engineering Co., Wickliffe, Ohio, manufacturers of cranes, presses and shears, has been purchased outright by the McNeil Machine & Engineering Co. of Akron, Ohio. No changes will be made in overall management, organization or policies.

• **TRUCK DISTRIBUTER**—Distributorship for Clark Equipment Co.'s complete line of fork lift trucks and industrial towing tractors has been granted to Bond Industrial Equipment Co., 51 Clarkson St., New York.

• **NEW LOCATION**—Chase Brass & Copper Co. has announced that they have moved their warehouse in Philadelphia to larger quarters at 20th and Venango Sts.

• **TEXAS BRANCH**—Morse Twist Drill & Machine Co. of New Bedford, Mass., has opened a new branch office at 1903 South Harwood St., Dallas. The new branch is in charge of branch office manager James W. Cathey, who is assisted by Wesley Anderson.

• **EXPANDS PLANT**—The Kenmore Metals Corp. has announced that it is increasing its plant capacity approximately four times through the acquisition of a long term lease on part of the property formerly occupied by the American Brake Shoe Foundry, Jersey City. Kenmore's present production facilities at Warren, Pa., will be moved to Jersey City.

• **ACQUISITION**—Affiliated Gas Equipment, Inc. has announced that it has acquired the assets and business of the Bryant Heater Co., Tyler, Tex., which will now be known as the Bryant Heater Div. They will manufacture gas heating and automatic water heating equipment.

• **CHANGE OF ADDRESS**—Chain Belt Co. of Milwaukee has announced that its Los Angeles district office and warehouse has been moved to 3838 Santa Fe Ave. Newly installed facilities for the machining of power transmission items now supplement warehouse stocks of these items.

• **REELECTS OFFICERS**—The Eastern region of the Assn. of Steel Distributors, Inc. has re-elected its regional officers. Chairman is William Fabrikant, Fabrikant Steel Products, Inc., New York; vice-chairman, Joseph B. Brown, Erie Steel Co., Inc., Philadelphia; and secretary, Paul Goodwin, Eastern Steel & Metal Co. New Haven, Conn.

• **CHANGES NAME**—The National Founders Assn. has announced that it has changed its name to National Foundry Assn.

• **SERVICE SHOP**—A new apparatus service shop, replacing one established in 1923, was recently opened in Seattle by General Electric's Apparatus Dept. This new shop is staffed by factory-trained engineers and technicians to give round-the-clock service to users of motors, turbines, generators, controls and similar electric apparatus.

Machinery Taxes Rise For 20 Pittsburgh Firms

Pittsburgh

• • • A survey of Allegheny County plants has added \$59 million to machinery assessments of 20 companies here and more increases are due. The survey was made for Allegheny County by Cole-Layer-Trumble Co., Dayton, for a \$415,000 fee. The county calls it the first complete one ever made by "competent experts," but 18 of the 20 increases are being appealed.

U. S. Steel alone has filed 18 appeals to the tax authorities because its assessment was increased by \$46 million, enough to add \$1.5 million to its annual machinery tax bill in this district. Other firms that had their assessment boosted were: Mesta, Westinghouse, Pittsburgh Coke & Chemical, Dravo, Firth-Sterling, American Cyanamid, Russell, Burdsall & Ward, Continental Roll & Steel Foundry, Universal Cyclops, Blaw-Knox, Copperweld, Superior Steel, Pittsburgh Steel Foundry, Pittsburgh Steel, Vanadium Corp., Kelsey Hayes, and Standard Steel Spring.

ECA Mission Will Study Europe's Aluminum Needs

Washington

• • • A special ECA mission to study European needs for virgin aluminum in the United Kingdom, Netherlands and Belgium sailed from New York on Feb. 11, according to the Economic Cooperation Administration.

In cooperation with the governments of the three countries concerned the mission will study the overall needs of these and other European countries for virgin aluminum.

The mission will consist of Donald Colwell of Chicago and Albert Butler of Denver. Colwell is sales engineer of the Apex Smelting Co. of Chicago, one of the largest secondary aluminum smelting companies in the United States. Butler was associated with the Aluminum-Magnesium Div. of the War Production Board during the war.

The mission will visit England, the Netherlands and Belgium.

Says Only Surface Has Been Scratched on Ore In Labrador and Quebec

Ottawa

••• "The surface of the newly discovered iron ore deposits in Labrador and northern Quebec has barely been scratched." That's what W. H. Durrell, general manager of the Labrador Mining & Exploration Co. told the Canadian Institute of Surveying here recently. He said exploration of the productive area is being pushed forward, but will not be completed for many years—perhaps 100 or 150 years from now.

Discussing markets for the ore, he disclosed that New England interests are considering the establishment of steel plants along the Atlantic seaboard which would open up the possibility of marketing between 1 million and 2 million tons of ore a year. Both the Federal Reserve Bank at Boston and the New England Council had expressed interest, he said.

Acquires Valve Plant

Cincinnati

••• The Schaible Co. has acquired all the stock in the D. T. Williams Valve Co., manufacturer of high pressure valves. The Schaible Co. at present produces low-pressure valves and plumbing and heating equipment, with plants at Trenton, Ohio and Pasadena, Calif. Michael F. Schaible, head of the Schaible Co. will become chairman of the board and president of D. T. Williams, which will be operated as a corporate division of Schaible Co., retaining the D. T. Williams name. Frank X. Pund, Jr. will continue as vice-president of the D. T. Williams Div., Schaible Co.

Extends Shipping Permit

Washington

••• Permission for Canadian vessels to carry iron ore between U. S. ports on the Great Lakes is extended through the 1949 shipping season under a joint resolution now being considered by Congress.

The proposal (H.J.Res. 143), sponsored by Representative Weichel, R., Ohio, would continue a suspension of U. S. shipping laws

Without a larger population Canada can take only about 2 million tons for domestic use. Eventually it is hoped that the United Kingdom might buy another 2 million tons. However, the only large market available would be at Pittsburgh and the steel mills of the Middlewest.

Large power resources in the immediate area which promise cheap electric power also open the hope that electric smelting plants might eventually be built in the area. However, at present the building of blast furnaces, open-hearth furnaces and rolling mills would require investments on the basis of \$250 to \$300 a ton of actual steelmaking capacity. The company is not in a position to go into the steelmaking business at present, he reported.

Mr. Durrell stressed the importance of the St. Lawrence seaway development if the project were to compete against Lake Superior ores at Pittsburgh and Midwest steel centers.

in effect since World War II. Applicable shipping statutes are waived Mar. 15 to Dec. 15, 1949.

Average Earnings at Peak

Washington

••• Average weekly earnings of the nation's 13 million factory workers rose during 1948 to a new

high of \$55, according to preliminary estimates of the Bureau of Labor Statistics.

Meanwhile, the average work-week remained a fraction less than 40 hours. Average hourly wages continued at about the same levels for the last quarter 1948.

Highest average pay was received by workers in the fields of durable goods where the figure reached \$59.32. Increased overtime in the automobile and some other transport equipment fields was apparent.

New Construction Declines

Washington

••• New construction put in place in January is valued at about \$1260 million, it is estimated by the Commerce Dept.

Due to seasonal factors, this is a drop over the December 1948 total but represents a 9 pct increase over January a year ago—largely due to a difference in costs.

Industrial construction continued to register a decline, amounting to \$110 million for the month. In a surprise drop, there was a decline of 16 pct in the commercial field such as stores, shops and garages.

Although publicly financed construction was a third greater than a year ago, it still was nearly 10 pct less in January than in December.

QUARTER-CENTURY: Dr. Harold K. Work, right, national president of the American Society for Metals is shown presenting a 25-year membership certificate to J. Fletcher Harper, left, vice-president of the Globe Union Co., 1927 ASM president, at a Milwaukee chapter meeting as Guenther Hille of Ladish Co. looks on. Photo: courtesy of Walt Dickinson.



Republic Reports Record Sales, Operating Income

Cleveland

••• Record sales and operating revenue of Republic Steel Corp. in 1948 totaled \$772,000,047, compared with \$649,824,000 for 1947. Consolidated net income was \$46,438,382, compared with \$31,018,400 in 1947. Payrolls reached an all-time high in 1948 of \$245,000,000. Previous high was 1947 when \$219,700,000 was paid out in wages and salaries.

Provision for federal taxes on income in 1948 amounted to \$34,000,000, compared with \$23,250,000 in 1947 and \$9,000,000 in 1946.

Depreciation charges totaled \$23,016,000 during 1948, including \$7,000,000 accelerated depreciation on postwar construction costs.

In continuation of its postwar construction program Republic expended \$31,500,000 on improvements and additions during 1948. It is planned to continue this program of improvements and additions through 1949.

Republic earned 6¢ on each \$1 of sales in 1948, compared to 4¾¢ in 1947. The 1940 high was just under 7¢ per \$1 of sales.

Earnings in 1948 were at the rate of \$7.61 per share of common stock, compared with \$5.17 per share in 1947. Republic's 60,000 common stockholders were paid dividends of \$2.25 per share in cash during 1948 and in addition received as a stock dividend one share of common stock for each 25 shares held.

AMERICAN IRON AND STEEL INSTITUTE

Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

YEAR 1949

(Preliminary)

Period	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated weekly production (Net tons)	Number of weeks in month
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
† January	7,283,727	101.1	408,552	92.6	479,957	92.4	8,172,236	100.1	1,844,749	4.43
February										4.00
March										4.43
1st Quarter										12.86
April										4.29
May										

† Preliminary figures, subject to revision.

YEAR 1948

Period	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated weekly production (Net tons)	Number of weeks in month
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	6,768,497	95.5	343,169	77.5	361,110	79.0	7,472,776	93.6	1,686,857	4.43
February	6,245,338	94.3	340,596	82.3	354,270	82.9	6,940,204	93.0	1,676,378	4.14
March	6,841,578	96.6	363,235	82.0	403,322	88.2	7,608,135	95.3	1,717,412	4.43
1st Quarter	19,855,413	95.5	1,047,000	80.6	1,118,702	83.4	22,021,115	94.0	1,693,932	13.00
April	5,640,168	82.2	185,089	43.2	392,900	88.7	6,218,157	80.4	1,449,454	4.29
May	6,799,289	96.0	355,562	80.3	416,801	91.1	7,571,652	94.8	1,709,177	4.43
June	6,481,879	94.5	356,810	83.2	417,665	94.3	7,256,354	93.8	1,691,458	4.29
2nd Quarter	18,921,336	90.9	897,461	69.0	1,227,366	91.4	21,046,163	89.7	1,617,691	13.01
1st 6 Months	38,776,749	93.2	1,944,461	74.8	2,346,068	87.4	43,067,278	91.9	1,655,797	26.01
July	6,346,423	89.8	324,991	73.6	395,610	86.7	7,067,024	88.7	1,598,874	4.42
August	6,631,157	93.6	371,205	83.8	435,246	95.2	7,437,608	93.1	1,678,918	4.43
September	6,592,226	96.3	387,153	90.5	436,231	98.7	7,415,610	96.1	1,732,619	4.28
3rd Quarter	19,569,806	93.2	1,083,349	82.5	1,267,087	93.5	21,920,242	92.6	1,669,478	13.13
9 Months	58,346,555	93.2	3,027,810	77.4	3,613,155	89.4	64,987,520	92.1	1,660,386	39.14
October	7,118,299	100.5	409,545	92.5	459,268	100.4	7,987,112	100.0	1,802,960	4.43
* November	6,922,656	100.9	411,049	95.9	454,217	102.6	7,787,922	100.7	1,815,366	4.29
* December	6,925,300	98.0	393,609	89.1	452,266	99.1	7,771,175	97.5	1,758,184	4.42
* 4th Quarter	20,966,255	99.8	1,214,203	92.4	1,365,751	100.7	23,546,209	99.4	1,791,949	13.14
* 2nd 6 months	40,536,061	96.5	2,297,552	87.5	2,632,838	97.1	45,466,451	96.0	1,730,737	26.27
* Total	79,312,810	94.9	4,242,013	81.2	4,978,906	92.3	88,533,729	94.0	1,693,453	52.28

Note—The percentages of capacity operated are calculated on weekly capacities of 1,599,286 net tons open hearth, 99,962 net tons Bessemer and 103,228 net tons electric ingots and steel for castings, total 1,802,476 net tons; based on annual capacities as of January 1, 1948 as follows: Open hearth 83,610,690 net tons, Bessemer 5,226,000 net tons, Electric 5,396,770 net tons, total 94,233,460 net tons.

* Revised.

British Deputation Seeks Equal Competitive Status

London

••• Increasing German competition in the world's markets for engineering products is beginning to cause alarm among British manufacturers. Major complaint is not about growing exports but about cut prices resulting from lower German labor and production costs.

A deputation from Britain's engineering industry has been waiting for the Board of Trade to seek government action. They declare that Germany has already captured a number of valuable orders. Also represented on the deputation were several engineering and allied trade unions.

An official of the Confederation of Shipbuilding and Engineering Unions said that it was not a question of wanting to exclude Germany from world trade. It is instead wanting to be assured that when Germany did come forward with an increasing volume of export goods, British manufacturers would be assured of equal competitive status.

Canadian Output at Peak

Montreal

••• Canadian steel production last year was the highest in the country's history. The 1948 total of 3,089,027 tons shows an increase of 234,495 tons over 1947. This is also 130,121 tons over the 1942 wartime peak of 2,958,906 tons.

December output was 271,128 tons, which was slightly over the November level of 267,671 tons.

Seeks Increase in Exports

Prague

••• Czechoslovakia is giving special attention to increasing exports—especially to Latin America, according to the Latin America Chamber of Commerce in Prague. Meanwhile exports of cutlery to the African continent are progressing favorably. Tractors are also playing an important part in domestic and foreign trade, with the bulk of exports going to Poland, Denmark and French possessions.

The Skoda Works in Prague is

currently working on about \$500,000 worth of equipment and machinery for a brewery under construction on Cyprus. Motor manufacturers are reported to be exporting 45 pct of their present output of cars and 21 pct of the motorcycle production.

Agree on Trade Program

Brussels

••• The Governments of Belgium, Luxembourg and Britain have agreed on a trade program covering British needs for \$20 million worth of steel and other essential products. In addition, Britain will facilitate the import of less essential goods from Belgium up to a value of \$3 million.

In return the Belgium and Luxembourg governments will study means of increasing imports from Britain and the rest of the sterling area in substitutions for imports from the dollar area.

Stabilizes Workers' Wages

Stockholm

••• The Swedish Labor Federation recently recommended that the trade unions prolong their agreements with employers for one year. This recommendation has generally been accepted. All wages and salaries are therefore likely to remain unchanged until the end of 1949.

The Labor Board has forecast continued high labor throughout the year with some general shortage of manpower. Some industries will probably be affected by the

import restrictions, and some will have to lay off men. Other industries, however, will need more manpower. This is expected to strike a balance.

May Up German Capacity

Dusseldorf

••• Signs point to Germany's getting more steel capacity than originally planned. Paul Hoffman, United States ECA head, has reportedly accepted the Humphrey Committee proposal for retention of 200 German plants. Mr. Hoffman has continually argued against excessive dismantling of German heavy industry.

Retention of these plants would increase German capacity from the proposed 10.7 million tons annually to 13 million tons. German industrialists feel that they need a minimum capacity of about 15 million tons for economic stability.

The 13 million ton capacity now needs French and British approval.

Russian Zone Output Lags

Berlin

••• Production in the Russian Zone of Germany was maintained at about 2.5 million tons annually well into the war years. Latest figures available (1946) show production of pig iron at 124,000 tons; ingots, 167,000 tons, and finished steel at 120,000 tons.

The target for 1950 sets output of pig iron at 360,000 tons; ingots, 875,000 tons, and finished steel, 650,000 tons.

Coming Events

- Feb. 23-25 American Concrete Institute, annual meeting, New York.
- Feb. 28-Mar. 4 American Society for Testing Materials, spring meeting, Chicago.
- Mar. 8-10 Society of Automotive Engineers, passenger car, body and production meeting, Detroit.
- Apr. 4-6 American Gas Assn., distribution, motor vehicle and corrosion conference, Cincinnati.
- Apr. 5-6 Metal Powder Assn., annual meeting, Chicago.
- Apr. 8-9 Lead Industries Assn., annual meeting, Chicago.
- Apr. 11-12 American Machine Tool Distributors' Assn., spring meeting, Savannah, Ga.
- Apr. 11-14 National Assn. of Corrosion Engineers, annual conference and exhibition, Cincinnati.
- Apr. 18-20 Midwest Power Conference, Chicago.
- Apr. 18-20 American Institute of Mining & Metallurgical Engineers, annual Conference of Openhearth Steel Committee, Chicago.
- Apr. 19-20 Magnesium Assn., annual meeting, Chicago.

Construction Steel . . .

• • • Fabricated steel awards this week included the following:

- 32,000 Tons, Wilmington, Del., Delaware Memorial Bridge, to American Bridge Co., Pittsburgh.
- 1700 Tons, Lewiston, Idaho, steel bridge across Clearwater River, through Henry Haggman Co., Cashmere, Wash., to Pittsburgh-Des Moines Steel Co.
- 800 Tons, New Bedford, Mass., power plant for New Bedford Gas & Edison Co., to A. O. Wilson Structural Steel Co., Cambridge, Mass.
- 585 Tons, Holcombe, Wis., Chippewa River Bridge for Northern States Power Co. through L. G. Arnold, Inc., Eau Claire, Wis., to Bethlehem Steel Co., Bethlehem, Pa.
- 420 Tons, St. Louis, service building for the Electro Motive Div. of GMC to J. T. Ryerson & Sons, Chicago.
- 350 Tons, Portsmouth, N. H. coal handling plant for C. H. Sprague Co. through

William T. Donovan Co., Boston, to A. O. Wilson Structural Steel Co., Cambridge, Mass.

- 300 Tons, Edgewater, N. J. detergent plant for Lever Bros. through Stone & Webster Engineering Corp. to American Bridge Co., Pittsburgh.
- 300 Tons, Des Moines, Ia., administration building for Garner & Styles to Pittsburgh Des Moines Steel Co., Des Moines, Ia.
- 210 Tons, Waukegan, Ill., building for Johnson Motors Co., through Campbell Lowrie & Lautermilch, Chicago, to J. T. Ryerson & Sons, Chicago.
- 200 Tons, Portland, Ore., Bonneville Power Administration, Inv. 4438, to Isaacson Iron Works, Seattle.
- 170 Tons, Bellwood, Ill., building for Sauerman Bros. to American Bridge Co., Pittsburgh.
- 170 Tons, Chicago, Diesel Service Building for the Milwaukee Railroad to J. T. Ryerson & Son, Chicago.

- 160 Tons, Stowe, Pa., building for Stanley G. Flagg, Co., to Lehigh Structural Steel Co., Allentown, Pa.
- 150 Tons, Little Neck, Long Island, N. Y.—2-story Temple Beth El to Grand Iron Works, New York.
- 125 Tons, Portland, Ore., ramp, etc., west end of Steel Bridge, through Kuckenberg Construction Co., Portland, to Gunderson Bros.
- 120 Tons, Chicago, building for Kraft Foods Co., through Campbell Lowrie & Lautermilch, Chicago, to J. T. Ryerson & Sons, Chicago.
- 115 Tons, Park Co., Mont., bridge on Emigrant Bridge Road, through McLaughlin Construction Co., Livingston, Mont. to Bethlehem Steel Co., Inc.

• • • Fabricated steel inquiries this week included the following:

- 6175 Tons, Steelton, Pa. bridge across Susquehanna River, Pennsylvania Turnpike, due Feb. 28.
- 2000 Tons, Indianapolis, Veterans Hospital. Bids close March 8.
- 500 Tons, Hinsdale, Ill., high school building.
- 400 Tons, Sunbury, Pa., hospital, due Feb. 24.
- 200 Tons, Mercersburg, Pa., laboratory building for Mercersburg Academy, due Feb. 21.
- 170 Tons, Skokie, Ill., through Cook Co. Engineers, High Bridge Section 263-099-1-15D. Arcol Midwest Corp., Chicago, Low Bidder.
- 160 Tons, Trenton, N. J., bridge, Route 26 Section 1-B, New Jersey Dept. of Highways, Franklin Contracting Co., New York, low bidder.
- 130 Tons, Siskiyou Co., Calif., bridge across Dillon Creek, Calif. Div. of Highways, Sacramento, bids to Mar. 9.

• • • Reinforcing bar awards this week included the following:

- 645 Tons, Portland, Ore., ramp, etc., west end of Steel Bridge, through Kuckenberg Construction Co., Portland, to Soule Steel Co.
- 475 Tons, Chicago, Beverly Calumet sewer project through Santucci Construction Co., Skokie, Ill., to Carnegie-Illinois Steel Corp.
- 125 Tons, Lewiston, Idaho, bridge across Clearwater River, through J. H. Wise & Son, Boise, to Northwest Steel Rolling Mills, Seattle.
- 75 Tons, Chicago, Greyhound Bus Station. This item previously reported as 100 tons now placed through Ragner Berson, Inc., Chicago, to Ceco Steel Products Co., Chicago.

• • • Reinforcing bar inquiries this week included the following:

- 600 Tons, Indianapolis, Veterans Hospital. Bids were to have closed Feb. 15. They are now extended to Mar. 8.
- 320 Tons, Madison, Wis., dairy building for the University of Wisconsin. J. H. Findoroff & Sons Co., Madison, Wis., low bidder.

• • • Cast iron pipe awards this week included the following:

- 1200 Tons, Memphis, Tenn., 6-in. cast iron pipe, Light, Gas & Water Div., City of Memphis to North Birmingham, Ala. plant of U. S. Pipe & Foundry Co.

• • • Railroad car awards and inquiries this week included the following:

- 400 PS-1 box cars have been ordered by the Canadian Pacific R. R. from Pullman Standard Car Mfg. Co., Chicago. Ford Motor Co. has placed an order for 50 100-ton flat cars with the Greenville Steel Car Co., Greenville, Pa.

50 YEARS AGO

THE IRON AGE, February 16, 1899

• The business cycle was up. "Failures in January were the smallest in 64 months and in proportion to the volume of solvent business shown by payments through the clearing houses were the smallest ever known despite the fact that January is usually one of the largest months for failures."

• "Professor Walter Nernst of Goettingen University in Germany has invented an electric lamp which does not require an enclosure in a vacuum."

• "The trade is getting somewhat excited over the danger of scarcity of materials which is reflected in quite a large advance in prices all along the line. The real test will come when pending low priced contracts expire and the tonnage for the second half of the year is covered." This is quite a parallel to what we are now in again.

• "Last Saturday when the thermometer was several degrees below zero, measurements were

taken of the trusses and other parts of the Brooklyn Bridge to find the extent of contraction. In comparing these figures with those taken last July when the temperature stood at 99 degrees above zero, it was found that the difference was 14 ft 6 in."

• There was something suspicious about the report of increasing exports of iron rails. THE IRON AGE reports, "We doubt that 10,000 tons of rails were made in the whole of the United States in 1898. We feel convinced that these rails are really old rails which should be included with scrap. We may add that we have a suspicion that relayers have crept into the returns of exports of steel rails."

• Establishment of many cotton and woolen mills, breweries, flour and saw mills caused a change in New England's metal requirements. An IRON AGE editor pointed out that "importations of babbitt metal, phosphor bronze and other antifriction metals are constantly increasing."

WAA Approves Sale Of Basic Magnesium Plant

Washington

• • • War Assets Administration has approved the sale of the government-owned land, mining claims, buildings, machinery and equipment comprising the former Basic Magnesium, Inc., feeder plant (Plancor 201) at Gibbs, Nev.

The property, together with a rotary kiln and accessories to be transferred from the government's alumina plant at Baton Rouge, La., was sold to Basic Refractories, Inc., Cleveland, for \$625,000. Basic will also lease the townsite of Gibbs, a government housing development.

The new owners will convert the plant to the production of magnesia refractories and will

add a second rotary kiln later. Production is expected to commence by next July.

Union in Ford Residence

Detroit

• • • The residence of the late Edsel Ford will eventually house all activities of the UAW-CIO at Detroit.

The autoworkers union has completed plans to build a new headquarters at 7930 E. Jefferson. The present building has recently been used as a union medical institute.

A union spokesman indicated that the present union headquarters at 411 W. Milwaukee will be vacated when the new \$500,000 structure is completed. The new building will have 70,000 sq ft of floor space and will house all the

UAW-CIO departments which are at present scattered throughout the city.

A definite date for the start of construction has not been announced.

MIT Plans Laboratory

Boston

• • • Dr. James R. Killian, Jr., president of Massachusetts Institute of Technology, announced at a midwinter alumni meeting that a hydrodynamics laboratory and model ship towing tank will be built immediately at a cost of at least \$500,000. The laboratory will house research in the behavior of liquids and gases. The towing tank will be used primarily to study hydrodynamic properties of ship hulls.

AMERICAN IRON AND STEEL INSTITUTE SHIPMENTS OF STEEL PRODUCTS ALL GRADES INCLUDING ALLOY AND STAINLESS (Net Tons)

DECEMBER - 1948
Month

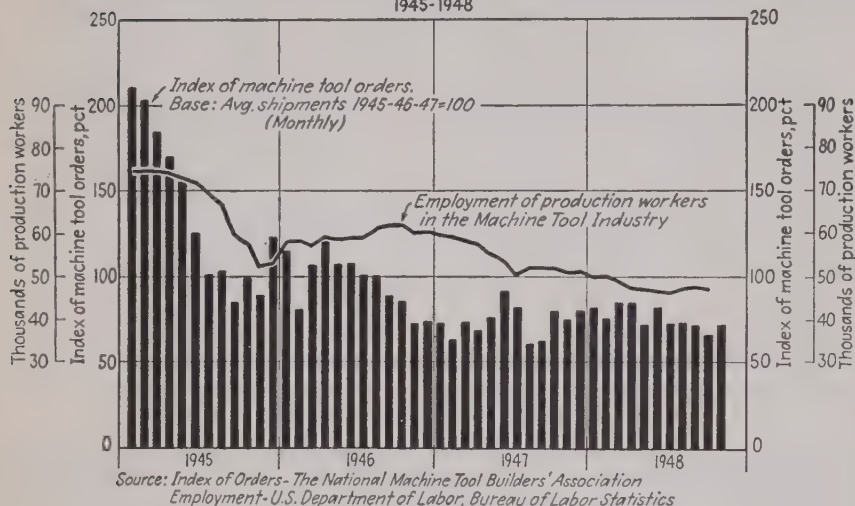
Steel Products	Number of companies	Items	Current Month				To Date This Year				Whole Year 1947			
			Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale)		Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale		Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale)		Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale		Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale)		Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale	
			(Net Tons)	Per cent of Total Shipments	(Net Tons)	Per cent of Total Shipments	(Net Tons)	Per cent of Total Shipments	(Net Tons)	Per cent of Total Shipments	(Net Tons)	Per cent of Total Shipments	(Net Tons)	Per cent of Total Shipments
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	45	1	293,595	4.9	278,686	4.8	3,270,644	4.7	2,966,748	4.7	2,396,343	4.7	2,396,343	4.7
Structural shapes (heavy)	12	2	393,884	6.5	3,088	6.5	25,961	4,436,129	7.0	2,640	2,640	2,640	2,640	2,640
Steel piling	4	3	30,483	0.5	-	0.5	1,435	324,224	0.5	23	23	23	23	23
Plates (sheared and universal)	29	4	657,773	10.9	31,831	10.6	367,394	6,345,216	10.1	219,227	219,227	219,227	219,227	219,227
Skelp.	7	5	8,181	0.1	48,649	0.1	75,252	160,989	0.3	384,004	384,004	384,004	384,004	384,004
Rails—Standard (over 60 lbs.)	4	6	170,817	2.8	638	2.8	1,976,520	12,911	2,207,146	3.5	991	991	991	991
—All other	5	7	19,034	0.3	193	0.3	214,880	211,900	0.3	329	329	329	329	329
Joint bars	7	8	12,835	0.2	3,468	0.2	137,139	42,904	0.3	15,198	15,198	15,198	15,198	15,198
Tie plates	7	9	41,651	0.7	17	0.8	489,434	386	504,779	0.8	4,437	4,437	4,437	4,437
Track spikes	8	10	13,624	0.2	5	0.2	145,830	610	163,746	0.3	146	146	146	146
Hot Rolled Bars—Carbon	34	11	557,316	9.2	54,803	9.4	6,196,444	623,717	6,242,416	9.9	745,770	745,770	745,770	745,770
—Reinforcing—New billet	16	12	117,882	1.9	398	2.0	1,329,945	6,840	1,277,075	2.0	9,775	9,775	9,775	9,775
—Re-rolled	13	13	18,188	0.3	-	0.3	212,021	-	175,833	0.3	-	-	-	-
—Alloy	27	14	187,797	3.1	20,900	2.9	1,927,309	226,018	1,741,432	2.8	212,382	212,382	212,382	212,382
—TOTAL	44	15	881,183	14.5	76,101	14.6	9,665,719	856,575	9,436,758	15.0	967,927	967,927	967,927	967,927
Cold Finished Bars—Carbon	28	16	124,595	2.1	438	2.0	1,349,719	6,534	1,426,701	2.3	9,249	9,249	9,249	9,249
—Alloy	27	17	25,984	0.4	766	0.4	244,248	7,483	218,802	0.3	2,601	2,601	2,601	2,601
—TOTAL	35	18	150,579	2.5	1,204	2.4	1,593,967	14,017	1,645,503	2.6	11,850	11,850	11,850	11,850
Tool steel bars	18	19	7,185	0.1	14	0.1	88,376	1,458	87,279	0.1	1,670	1,670	1,670	1,670
Pipe & Tubes—Butt weld	16	20	199,895	3.3	2,148	3.1	2,045,361	27,785	1,892,691	3.0	78,080	78,080	78,080	78,080
—Lap weld	8	21	28,016	0.5	-	0.5	339,633	3	389,762	0.6	875	875	875	875
—Electric weld	13	22	140,133	2.3	623	2.4	1,572,139	5,424	1,254,325	2.0	4,274	4,274	4,274	4,274
—Seamless	17	23	268,818	4.4	15,076	4.4	2,924,416	168,298	2,581,106	4.1	157,208	157,208	157,208	157,208
Wire rods	22	24	81,875	1.4	24,459	0.9	610,348	299,727	667,282	1.1	331,192	331,192	331,192	331,192
Wire—Drawn	39	25	212,029	3.5	14,250	4.1	2,673,276	175,358	2,590,963	4.1	181,783	181,783	181,783	181,783
—Nails and staples	17	26	72,906	1.2	576	1.3	859,540	12,508	799,436	1.3	8,481	8,481	8,481	8,481
—Barbed and twisted	15	27	23,115	0.4	4	0.4	254,629	433	256,991	0.4	128	128	128	128
—Woven wire fence	13	28	33,959	0.6	397	0.6	399,457	3,935	407,295	0.6	3,616	3,616	3,616	3,616
—Bale ties	11	29	6,558	0.1	-	0.2	113,892	-	119,917	0.2	-	-	-	-
Black Plate—Ordinary	9	30	80,587	1.3	-	1.3	821,398	654	801,745	1.3	2,033	2,033	2,033	2,033
—Chemically treated	2	31	2,723	-	-	-	17,268	-	19,252	-	-	-	-	-
Tin and Terne Plate—Hot dipped	9	32	221,432	3.7	41	3.3	2,167,912	300	2,093,149	3.3	228	228	228	228
—Electrolytic	9	33	178,285	2.9	-	2.7	1,784,288	215	1,617,659	2.6	529	529	529	529
Sheets—Hot rolled	32	34	707,486	11.7	59,083	11.8	7,786,056	642,222	7,891,798	12.5	578,426	578,426	578,426	578,426
—Cold rolled	16	35	629,147	10.4	1,426	10.4	6,867,775	20,706	5,504,578	8.7	28,498	28,498	28,498	28,498
—Galvanized	16	36	139,683	2.3	229	2.5	1,643,337	2,965	1,609,881	2.5	889	889	889	889
Strip—Hot rolled	23	37	142,948	2.4	36,394	2.5	1,662,787	376,376	1,740,085	2.7	308,555	308,555	308,555	308,555
—Cold rolled	34	38	154,518	2.6	2,533	2.7	1,783,383	24,701	1,613,005	2.6	28,030	28,030	28,030	28,030
Wheels (car, rolled steel)	2	39	30,965	0.5	49	0.5	337,376	1,053	356,873	0.6	2	2	2	2
Axles	5	40	20,424	0.3	-	0.3	215,905	143	185,019	0.3	53	53	53	53
All other	41	41	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL STEEL PRODUCTS	140	42	6,056,282	100.0	601,182	100.0	65,973,138	6,887,118	63,057,150	100.0	5,717,765	5,717,765	5,717,765	5,717,765

During 1947 the companies included above represented 99.5 % of the total output of finished rolled steel products as reported to the American Iron and Steel Institute.

* Adjusted.

Machine Tool Industry Loses Skilled Workers; Low

MACHINE TOOL ORDERS AND EMPLOYMENT OF PRODUCTION WORKERS
1945-1948



Cleveland

••• In a period symptomatic of business boom in most of the mass-production industries of the nation, the machine tool industry, which serves mass production but is not a mass production industry, is losing its trained men.

This anomaly is the result of a lack of machine tool orders and not a move by choice on the part of the employers and, presumably, the employees. Periods of low demand are a cyclic development neither new nor old in the machine tool industry, which poses a difficult industry problem meriting careful consideration in the present unsettled state of world affairs.

It has been estimated that about two thirds of the men in a machine tool plant must be skilled men, and about one fourth of those men highly skilled.

In past periods of low demand, companies have been known to lose 30 pct of their skilled men, most of them permanently. After the last depression, the industry lost about 25 pct of the men employed in 1929 and bringing them back was a problem. There is a natural obsolescence of men as well as machines, according to the experts, and in 1934 the machine

tool industry was confronted with a shortage of skilled men.

Low order volume makes it difficult to continue the training of apprentices to replace the normal loss of skilled men through age, death and incapacity. It has been said that losses from natural causes and shifts away from the industry make it mandatory in many shops that training, if not apprentice programs, be constantly maintained.

It has been estimated that it takes from 3 to 6 months to train a machine operator and from 2 to 4 years to develop an all-around machinist.

In 1939, the machine tool industry employed 36,600 wage earners. With approximately twice 1939 plant capacity, the industry employed, as of October 1948, 47,600 wage earners. Employment in the industry has, in fact, been on a steadily descending scale since 1942, peak of the war effort, when 122,000 men were employed.

A sudden demand for a large number of machine tools would catch the industry on its heels, a fact clearly recognized by major segments of the industry. It would mean, among other things, a long and costly process of training men.

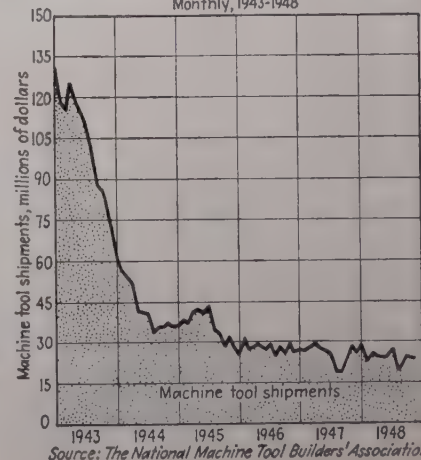
By BILL LLOYD
Cleveland Regional Editor

At the present time, the industry is idling along at 50 pct of capacity. Productivity is poor (see THE IRON AGE, Jan. 18, p. 102) and the costs of materials, labor and selling are at an all-time high. These factors have raised the break-even point for many machine tool companies to the danger zone. In another way, it adds up like this: if productivity were higher, selling costs could be lower, making machines more attractive to at least some buyers, volume would be greater and break-even points would be lower.

In an effort to retain the pick of the trained men, machine tool companies have attempted a number of expedients, including new products, ranging from garden tractors to fishing tackle. Other companies have divided the shop forces into two shifts, which work alternate weeks. But neither of these efforts has provided an answer.

Nobody has said as much, but it is likely that national interests would be well served if machine

ESTIMATED MACHINE TOOL SHIPMENTS FOR THE INDUSTRY
Monthly, 1943-1948



Order Volume Hinders Normal Training Programs

Companies Resort to a Number of Expedients to Retain Pick of Trained Men

tool volume were such that industry employment could be stabilized at about 50,000 men, or about 40 pct of peak wartime employment.

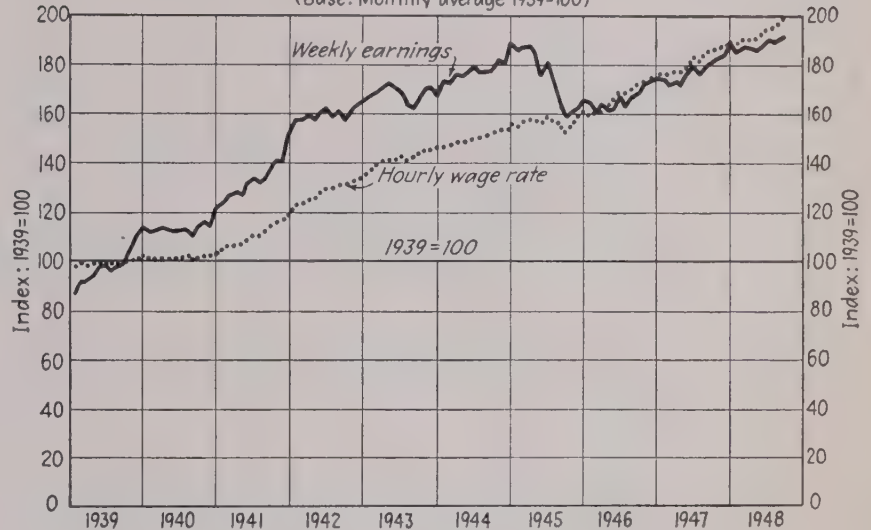
At the present level of productivity, believed by many to be somewhere in the vicinity of 70 pct, the industry's shipments would have to be at least \$400 million annually. But in 1948, in spite of the price increases, the industry did not reach \$300 million.

Employment in the industry is decreasing and probably will continue to do so during most of 1949. On the basis of 1939 dollars, the industry is producing less today than it did in 1939.

INDEX OF HOURLY WAGE RATES AND WEEKLY EARNINGS OF PRODUCTION WORKERS IN THE MACHINE TOOL INDUSTRY

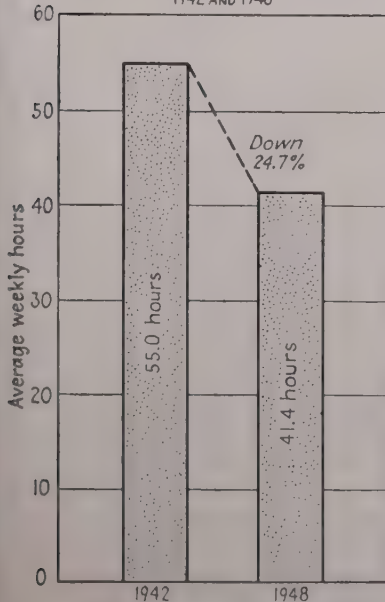
MONTHLY 1939-1948

(Base: Monthly average 1939=100)



Source: U.S. Department of Labor, Bureau of Labor Statistics

AVERAGE WEEKLY HOURS OF PRODUCTION WORKERS IN THE MACHINE TOOL INDUSTRY 1942 AND 1948



Source: U.S. Bureau of Labor Statistics

While hourly pay is high, take-home pay is down. Therefore, men are migrating to industries where there is more demand and they are being laid off. Prior to the recent curtailment of the draft there was no official word on draft exemption for industry and the threat of being drafted probably prompted some men to move to industries where the possibilities of job exemptions were apparently better.

Lack of orders is the key. As a shop superintendent recently put it, when the men look around the shop and see the planers and the boring mills standing idle, it affects them two ways. First, they try to drag out the available work as long as possible and begin thinking about getting a job in a shop where the prospects of abundant work appear to be better.

At the present time, the machine tool industry needs orders. Immediate and concrete action on the ECA machine tool program and the defense program would help.

But these programs are only in-

cidental expedients. What is really required is a long-range, permanent process for periods of low demand. When demand is low, plants buying machine tools should be allowed very substantial depreciation on their purchases. Low periods are the time to revamp plants.

Effects of this would be three-fold. It would make for low cost production at a later date; it would save and use the machine tool and construction industry workers and, finally, it would create a better psychological atmosphere.

As a fillip, the government, which is an important customer in practically every business, might time its buying to coincide with periods of low demand.

In the opinion of some observers, if a program of this sort is not set up, the nation faces the prospect of a decline in machine tool capacity. Companies will be fewer in number, larger in size. In time of war, such an industry would be less flexible, because of fewer companies, than it is today.

Senate Committee Calls Steel Distribution "Alarming"

Washington

• • • A Senate committee last week characterized current steel distribution practices as "alarming," and called upon the industry to take immediate remedial action.

This warning was issued by the Senate Small Business Committee in a special report on steel distribution. The report is based on steel distribution questionnaires sent to steel producers nearly 5 months ago (*THE IRON AGE*, Sept. 16, p. 123).

Senator Wherry, R., Neb., chairman of the now-defunct committee, urged in the report that steel management re-evaluate current distribution policies so as to strike a "proper balance between the interests of private profit and national welfare."

"If the experience in hot-rolled steel sheet distribution is typical of most other steel products covered by the committee's survey—and a rapid and admittedly cursory comparison indicates that it is—then the steel subcommittee feels that this distribution pattern is alarming," Mr. Wherry said in submitting the committee report.

The evaluation of the questionnaires completed by 14 steel producers was undertaken by Price, Waterhouse & Co. Companies submitting the distribution data are Alan Wood Steel Co., Armco Steel Corp., subsidiary companies of Bethlehem Steel Corp., Colorado Fuel & Iron Corp., Granite City Steel Co., Inland Steel Co., Jones & Laughlin Steel Corp., National Steel Corp., Pittsburgh Steel Co., Republic Steel Corp., Sharon Steel Corp., United States Steel Corp. of Delaware, Wheeling Steel Corp., and Youngstown Sheet & Tube Co.

The subcommittee in a separate and final report on its activities relating to steel, recommended:

- (1) A thorough study of supply and resources of supply of all basic materials.
- (2) A study and investigation of existing capacities in all plants engaged in the production of steel to determine the utilization of present capacity, precisely what kinds of capacity need expansion, and what technological improvements could result in increased production with a minimum expenditure of extra steel or basic materials.
- (3) That a joint committee of Congress be established to study and report upon the basic materials, capacity, and production problem and be required to file its report on or before Oct. 1, 1949.
- (4) That the Commerce Dept. undertake an overall study of steel demand.
- (5) That appropriate Congressional committees keep close check on export of steel products and that export controls be extended to all exports to Canada.
- (6) That the voluntary allocations law be extended to March 31, 1950.

Shipments of Certain Finished Steel Products to Various Consuming Districts by Major Steel Firms in 1940 and 1947

Data from Senate Small Business Committee Report—Percentage compilations by THE IRON AGE

AREA (Note 1)	HOT-ROLLED SHEETS				COLD-ROLLED SHEETS				HOT-ROLLED STRIP				COLD-ROLLED STRIP				HOT-ROLLED BARS				COLD-FINISHED			
	Year 1940		Year 1947		Year 1940		Year 1947		Year 1940		Year 1947		Year 1940		Year 1947		Year 1940		Year 1947		Year 1940		Year 1947	
	Net Tons	Pct Total	Net Tons	Pct Total	Net Tons	Pct Total	Net Tons	Pct Total	Net Tons	Pct Total	Net Tons	Pct Total	Net Tons	Pct Total	Net Tons	Pct Total	Net Tons	Pct Total	Net Tons	Pct Total	Net Tons	Pct Total	Net Tons	Pct Total
Alabama.....	24,651	.55	46,778	.87	69	*	1,993	.04	1,920	.16	8,860	.70	239	.09	585	.09	65,053	1.95	84,050	1.66	599	.20		
Arizona.....	1,480	.03	1,406	.02	24	*	248	*	92	*	1,361	.10			73	.01	3,662	.11	5,101	.10	12	*		
Arkansas.....	1,248	.02	2,399	.04	106	*	519	.01	117	.01	2,683	.21	6	*	1,157	.18	3,824	.11	1,294	.02	145	.04		
California.....	130,274	2.90	194,542	3.75	17,572	.82	37,180	.87	9,535	.81	16,580	1.31	4,941	1.85	10,968	1.74	96,730	2.90	118,998	2.35	7,682	2.56		
Colorado.....	4,568	.10	9,039	.16	406	.01	937	.02	657	.05	1,174	.09	30	.01	436	.07	13,546	.40	32,117	.63	161	.05		
Connecticut.....	37,161	.82	57,699	1.08	5,939	.27	27,780	.65	11,049	.94	30,179	2.38	11,895	4.45	21,100	3.35	30,546	.91	50,309	.99	12,424	4.15		
Delaware.....	736	.01	7,806	.14	27	*	2,108	.05	8	*	201	.01	2	*	45	.01	639	.02	1,440	.03	6	*		
District of Columbia.....	1,038	.02	1,948	.03	48	*	794	.02	222	.02	181	.01	9	*	5	*	1,953	.06	3,787	.07	34	.01		
Florida.....	2,982	.06	6,908	.12	108	*	264	*	352	.03	857	.06	16	*			12,422	.37	13,265	.26	259	.08		
Georgia.....	9,086	.20	8,667	.16	855	.03	2,487	.05	1,227	.10	2,872	.22	98	.03	1,143	.18	9,318	.28	17,272	.34	1,150	.38		
Idaho.....	1,330	.02	858	.01	2	*	49	*	179	.01	100	.01	1	*			2,008	.06	2,907	.05	1	*		
Illinois:																								
Chicago area (Note 1).....	281,274	6.28	470,388	8.84	125,953	5.88	231,015	5.40	64,748	5.53	76,332	6.02	16,446	6.16	32,877	5.22	360,347	10.80	547,424	10.84	17,161	5.73		
All other Illinois.....	103,092	2.30	130,076	2.45	24,198	1.13	56,952	1.33	31,689	2.71	27,655	2.18	8,123	3.04	25,294	4.01	147,709	4.42	207,163	4.10	3,281	1.09		
Indiana.....	181,796	4.06	236,945	4.45	72,169	3.37	227,379	5.32	51,939	4.44	56,080	4.43	12,751	4.78	48,407	7.68	230,295	6.90	396,049	7.84	19,637	6.56		
Iowa.....	27,614	.61	43,700	.82	8,557	.39	19,804	.46	3,878	.33	6,230	.49	209	.08	1,193	.19	18,264	.54	35,864	.71	3,897	1.30		
Kansas.....	5,294	.11	10,586	.19	1,494	.06	12,935	.30	941	.09	1,661	.13	149	.05	670	.10	10,718	.32	14,820	.29	165	.05		
Kentucky.....	9,063	.20	22,874	.42	2,293	.10	10,850	.25	9,443	.80	9,671	.76	391	.14	2,406	.38	12,791	.38	27,691	.54	942	.31		
Louisiana.....	44,176	.98	22,604	.42	670	.03	6,720	.15	885	.08	1,890	.15	26	.01	7	*	9,227	.27	17,430	.34	1,352	.45		
Maine.....	1,461	.03	859	.01	745	.03	540	.01	217	.02	417	.03	439	.16	1,076	.17	8,951	.27	9,217	.18	1,501	.50		
Maryland.....	105,466	2.35	223,899	4.20	3,571	.16	23,917	.56	3,491	.30	7,367	.58	583	.22	1,543	.24	29,271	.87	45,012	.89	2,918	.97		
Massachusetts.....	59,991	1.33	80,671	1.51	25,502	1.19	56,270	1.31	27,378	2.34	34,229	2.70	9,915	3.71	22,830	3.62	74,426	2.23	118,175	2.34	15,341	5.13		
Michigan:																								
Detroit area (Note 1).....	1,170,172	26.10	1,174,858	22.08	978,396	45.69	1,458,386	34.12	397,079	33.95	297,609	23.50	48,101	18.02	135,784	21.56	533,628	16.00	665,196	13.18	60,530	20.23		
All other Michigan.....	153,397	3.42	86,528	1.62	153,009	7.14	282,275	6.60	12,917	1.10	15,323	1.21	8,642	3.24	20,000	3.17	34,128	1.22	48,554	.96	13,429	4.49		
Minnesota.....	25,792	.57	41,406	.77	15,734	.73	33,973	.79	3,705	.31	5,807	.46	369	.13	2,046	.32	36,895	1.10	61,821	1.22	1,419	.47		
Mississippi.....	1,409	.03	3,461	.06	42	*	801	.02	96	*	3,321	.26			42	.01	3,569	.10	4,327	.08	41	.01		
Missouri.....	78,329	1.74	80,158	1.50	17,970	.83	43,128	1.01	6,808	.58	6,564	.52	1,759	.66	8,410	1.33	24,469	.73	46,581	.92	3,113	1.04		
Montana.....	990	.02	1,922	.03	74	*			88	*	21	*					2,320	.06	2,886	.05	79	.02		
Nebraska.....	3,823	.08	9,143	.17	1,141	.05	1,644	.03	967	.10	796	.06	37	.01	689	.11	6,638	.19	9,113	.18	129	.04		
Nevada.....	327	*	87	*			18	*	19	*							760	.02	276	*	4	*		
New Hampshire.....	8,396	.18	9,580	.18	324	.01	363	.01	153	.01	29	*	113	.04	369	.06	1,748	.05	1,096	.02	439	.14		
New Jersey.....	99,414	2.22	93,102	1.75	31,334	1.46	62,073	1.45	24,483	2.09	28,504	2.25	10,379	3.89	21,874	3.47	80,583	2.41	133,891	2.65	12,497	4.17		
New Mexico.....	471	*	725	.01					68	*	113	.01					6,051	.18	4,793	.09	12	*		
New York:																								
New York City area (Note 1).....	91,244	2.03	93,916	1.76	28,257	1.31	87,548	2.05	33,033	2.82	34,181	2.70	15,498	5.80	12,144	1.93	51,147	1.53	105,770	2.09	4,497	1.50		
All other New York.....	131,956	2.94	123,299	2.31	44,396	2.07	145,849	3.41	25,344	2.16	30,837	2.43	26,532	9.94	55,981	8.89	167,903	5.03	274,432	5.43	15,616	5.22		
North Carolina.....	4,852	.10	6,049	.11	1,28																			

Important Notice

No grand total of steel shipments by states was given here because the items were selective and did not include total finished steel shipped in 1940 and 1947. It can be found on page 141 this issue. The amount of estimating from the reports of the 14 large steel firms involved was not enough to change, to any great extent, the tonnage shown going to the states or the product breakdown. To show some validity of the figures reported here, total 1947 product tons were compared with national

output of the same products as reported by the American Iron & Steel Institute for the year 1947. Hot-rolled sheet shipments in this report were 67 pct of total shipments; cold-rolled sheets were 78 pct; hot-rolled strip was 73 pct; cold-rolled strip was 39 pct; hot-rolled bars were 81 pct of national shipments; cold-rolled bars were 48 pct; seamless pipe was 74 pct; lapweld pipe was 52 pct; electricweld pipe was 54 pct; butt-weld pipe was 93 pct; and mechanical tubing was 56 pct.

BARS		BUTT-WELD PIPE				LAP-WELD PIPE				ELECTRIC WELD				MECHANICAL AND PRESSURE				SEAMLESS PIPE				AREA (Note 1)
Year 1947		Year 1940		Year 1947		Year 1940		Year 1947		Year 1940		Year 1947		Year 1940		Year 1947		Year 1940		Year 1947		
Tons	Pct Total	Net Tons	Pct Total	Net Tons	Pct Total	Net Tons	Pct Total	Net Tons	Pct Total	Net Tons	Pct Total	Net Tons	Pct Total	Net Tons	Pct Total	Net Tons	Pct Total	Net Tons	Pct Total	Net Tons	Pct Total	
2,072	.30	13,315	1.39	20,425	1.28	779	.55	4,315	2.10	2,899	2.27	2,804	.65	914	.67	538	.14	7,166	.65	2,697	.17	Alabama
391	.05	4,788	.50	5,824	.36	324	.23	781	.38	221	.17	689	.16	18	.01	7	*	1,793	.16	25,450	1.63	Arizona
566	.08	3,975	.41	7,339	.46	953	.67	3,704	1.81	712	.56	29,898	7.01	159	.11	276	.07	7,091	.64	19,895	1.27	Arkansas
5,342	3.68	84,846	8.89	155,982	9.77	6,712	4.75	18,447	9.00	10,894	8.56	13,313	3.12	3,590	2.63	11,453	3.08	109,405	9.97	146,603	9.38	California
3,547	.51	6,783	.71	12,033	.75	731	.51	3,172	1.55	366	.28	42,167	9.88	1,209	.89	715	.19	1,991	.18	23,412	1.50	Colorado
8,528	4.14	8,506	.89	10,418	.65	1,030	.73	900	.44	789	.62	1,178	.27	453	.33	3,577	.96	3,623	.33	696	.04	Connecticut
1	*	3,853	.40	3,601	.22	569	.40	530	.26	380	.30	56	.01	52	.03	1,382	.37	1,226	.11	734	.04	Delaware
671	.09	5,046	.53	6,903	.43	1,330	.94	1,009	.49	69	.05	213	.05	306	.22	83	.02	2,244	.20	1,365	.08	District of Columbia
930	.13	12,905	1.35	21,177	1.32	1,046	.74	1,852	.90	422	.33	653	.15	262	.19	545	.14	3,441	.31	1,296	.08	Florida
2,868	.41	12,771	1.34	21,746	1.36	1,366	.95	2,013	.98	520	.40	854	.20	577	.42	2,533	.68	19,581	1.78	2,354	.15	Georgia
126	.01	2,879	.30	3,604	.22	185	.13	280	.13	5	*	22	.01	12	.01	50	.01	202	.01	55	*	Idaho
8,157	9.90	54,592	5.72	75,143	4.71	5,650	4.00	10,390	5.07	8,630	6.78	17,500	4.10	5,442	3.99	24,205	6.51	13,024	1.08	18,267	1.17	Illinois:
4,196	2.06	24,747	2.59	34,738	2.17	5,886	4.17	3,839	1.87	4,502	3.54	18,334	4.30	8,184	6.01	17,586	4.73	100,353	9.15	61,753	3.95	Chicago area (Note 1)
5,778	5.20	23,273	2.44	38,458	2.41	3,898	2.76	5,074	2.47	5,563	4.37	14,357	3.36	7,201	5.29	27,666	7.45	45,440	4.14	11,193	.71	All other Illinois
7,520	1.09	9,698	1.01	17,363	1.09	1,261	.89	1,502	.73	1,170	.92	4,354	1.02	329	.24	4,254	1.14	1,862	.17	4,895	.31	Indiana
2,231	.32	7,491	.78	30,452	1.91	2,523	1.78	6,904	3.37	1,399	1.10	22,430	5.26	904	.66	3,721	1.00	58,913	5.37	71,942	4.60	Iowa
2,170	.31	15,281	1.60	21,296	1.33	1,614	1.14	5,299	2.58	306	.24	1,001	.23	3,503	2.57	6,275	1.69	7,208	.65	11,141	.71	Kansas
2,968	.43	17,604	1.84	33,515	2.10	6,988	4.95	6,942	3.39	9,305	7.31	3,931	.92	1,266	.93	2,115	.59	74,948	6.83	110,394	7.07	Kentucky
2,697	.39	2,774	.29	3,154	.19	123	.08	22	.01	94	.07	49	.01	88	.06	405	.11	3,814	.34	151	.01	Louisiana
3,380	.49	14,243	1.49	21,658	1.35	2,637	1.86	2,272	1.11	944	.74	1,494	.35	1,122	.82	2,396	.64	11,331	1.03	2,675	.17	Maine
8,685	4.17	20,287	2.12	28,940	1.81	2,699	1.87	3,628	1.71	4,798	3.77	5,482	1.28	2,222	1.63	5,240	1.41	3,291	.30	2,499	.16	Maryland
4,901	18.15	25,405	2.66	30,978	1.94	1,890	1.34	2,555	1.24	8,989	7.06	16,146	3.78	6,276	4.61	25,724	6.92	6,970	.63	8,075	.51	Massachusetts
6,065	3.79	12,324	1.29	16,499	1.03	2,710	1.92	2,431	1.18	8,122	6.38	11,545	2.70	11,303	8.30	27,705	7.46	10,798	.98	10,134	.65	Detroit area (Note 1)
7,821	1.13	14,128	1.48	17,859	1.12	1,435	1.01	1,615	.79	884	.69	1,829	.43	950	.70	3,927	1.05	2,324	.21	4,029	.25	All other Michigan
477	.07	3,666	.38	10,564	.66	896	.63	593	.29	3,262	2.56	1,238	.29	29	.02	939	.25	10,355	.94	44,557	2.85	Minnesota
9,640	2.85	15,164	1.59	27,905	1.75	1,564	1.10	2,715	1.32	1,617	1.27	14,598	3.42	1,831	1.34	6,251	1.68	30,924	2.82	21,986	1.40	Mississippi
31	*	4,440	.46	4,530	.28	2,068	1.46	861	.42	453	.35	239	.05	24	.02	94	.02	3,226	.29	5,979	.38	Missouri
1,087	.15	6,355	.66	9,163	.57	475	.33	1,332	.65	533	.41	7,331	1.72	243	.18	1,077	.29	3,460	.31	1,157	.07	Montana
591	.08	1,671	.17	1,419	.09	71	.05	65	.03	64	.05	16	*	2	*	*	*	122	.01	20	*	Nebraska
2,463	3.26	34,549	3.62	59,351	3.72	6,446	4.56	11,752	5.73	987	.77	6,563	1.54	8,394	6.16	20,918	5.63	10,641	.97	6,268	.40	Nevada
6	*	3,835	.40	7,949	.50	1,402	.99	3,374	1.64	485	.38	218	.04	1	*	57	.01	11,698	1.06	50,130	3.21	New Hampshire
9,162	1.33	31,312	3.28	42,353	2.65	2,647	1.87	3,073	1.50	5,674	4.46	7,951	1.85	3,674	2.70	9,751	2.62	24,025	2.19	24,749	1.58	New Jersey
6,326	3.82	28,508	2.99	50,949	3.19	6,103	4.32	8,354	4.07	3,971	3.12	10,510	2.45	14,676	10.78	14,516	3.91	15,092	1.37	12,678	.81	New Mexico
2,916	.42	13,789	1.44	19,417	1.21	1,074	.76	1,066	.52	530	.41	704	.16	484	.36	723	.19	339	.03	680	.04	New York:
99	.01	1,052	.11	1,273	.08	34	.02	9	*	2	*	28	.01	26	.02	63	.01	33	*	184	.01	New York City area (Note 1)
44,431	7.91	16,417	1.72	24,389	1.53	2,887	2.04	3,417	1.67	6,212	4.88	17,639	4.13	3,998	2.93	10,582	2.85	6,958	.63	18,084	1.15	All other New York
4,023	.58	5,319	.55	9,710	.61	1,286	.91	1,973	.96	497	.39	3,547	.83	630	.46	2,486	.67	4,305	.39	18,766	1.20	North Carolina
8,723	9.99	38,795	4.07	60,338	3.78	7,667	5.43	10,193	4.97	2,522	1.98	18,113	4.24	7,011	5.15	17,777	4.78	36,031	3.28	22,512	1.	

New York

• • • The type of information in the Senate Small Business Committee report on steel distribution is not usually available. Compilations in the insert page may serve as basic data in studying steel consumption by states. All steel products were not covered but the ones on which data are most often sought were studied. The 14 steel firms whose reports made possible the tabulations account for most of the output of finished steel products in the study.

FOURTEEN STEEL COMPANIES

Combined shipments of carbon-steel products

(listed below) by geographic areas

Area (note 1)	Net product tons	
	Year 1940	Year 1947
Alabama.....	117,604	175,117
Arizona.....	12,414	41,331
Arkansas.....	18,336	69,730
California.....	452,181	749,408
Colorado.....	30,448	128,749
Connecticut.....	123,415	232,356
Delaware.....	7,498	17,904
District of Columbia.....	12,299	16,959
Florida.....	34,215	47,747
Georgia.....	56,549	64,809
Idaho.....	6,804	8,051
Illinois:		
Chicago area (note 1).....	953,267	1,571,698
All other Illinois.....	461,764	597,586
Indiana.....	653,962	1,097,386
Iowa.....	76,739	146,679
Kansas.....	89,991	178,352
Kentucky.....	62,835	120,674
Louisiana.....	166,447	208,516
Maine.....	20,207	18,587
Maryland.....	175,577	335,613
Massachusetts.....	245,850	386,649
Michigan:		
Detroit area (note 1).....	3,237,436	3,940,212
All other Michigan.....	420,779	547,068
Minnesota.....	103,635	182,133
Mississippi.....	23,365	70,320
Missouri.....	183,548	277,936
Montana.....	13,762	16,563
Nebraska.....	23,801	42,532
Nevada.....	3,040	1,901
New Hampshire.....	14,098	14,022
New Jersey.....	319,707	466,759
New Mexico.....	24,023	67,365
New York:		
New York City area (note 1).....	291,008	430,598
All other New York.....	480,097	753,731
North Carolina.....	29,287	49,083
North Dakota.....	2,052	3,259
Ohio:		
Cleveland area (note 1).....	832,960	1,109,832
Canton—Massillon—Mansfield area (note 1).....	142,518	285,284
All other Ohio.....	945,675	1,544,802
Oklahoma.....	66,735	182,048
Oregon.....	33,327	53,392
Pennsylvania:		
Philadelphia area (note 1).....	533,241	752,734
All other Pennsylvania.....	1,075,723	1,961,412
Rhode Island.....	50,378	55,909
South Carolina.....	14,394	19,230
South Dakota.....	3,224	3,383
Tennessee.....	95,965	137,404
Texas.....	525,918	913,972
Utah.....	14,523	21,290
Vermont.....	6,749	6,286
Virginia.....	70,046	83,206
Washington.....	60,066	73,739
West Virginia.....	137,153	354,906
Wisconsin.....	543,037	707,492
Wyoming.....	9,595	41,228
Total, all States.....	14,144,258	21,384,932

NOTE.—This statement presents the aggregate shipments of the following carbon-steel products.

listed individually on pp. 3 to 12 (Form I):

Hot-rolled sheets	Butt-weld pipe
Cold-rolled sheets	Lap-weld pipe
Hot-rolled strip	Seamless pipe
Cold-rolled strip	Electric-weld tubing
Hot-rolled bars	Mechanical and pressure tubing
Cold-finished bars	

There will be some variance between total steel figures for the specified items published elsewhere and those shown in the Senate report. Such differences will not be large enough to change the percentage figures for the various states.

State by state data on plates, wire, rails, tinplate and other items are missing from the Senate report. For that reason the figures in the table below do not represent total steel distribution to states—only combined shipments of the products specified in the committee report.

Shipments of selected carbon-steel products to fabricating subsidiaries¹

(Net product tons)

	1940		1947	
	Tons	Shipments to fabricating subsidiaries as percent of total shipments ²	Tons	Shipments to fabricating subsidiaries as percent of total shipments ²
Sheets:				
Hot-rolled.....	310,376	5.7	651,423	10.5
Cold-rolled.....	59,261	2.5	255,894	6.5
Strip:				
Hot-rolled.....	16,126	1.5	49,315	3.7
Cold-rolled.....	4,274	1.9	17,334	2.7
Structural shapes.....	600,662	19.1	771,012	18.0
Plates.....	378,085	11.4	468,922	9.9
Bars:				
Hot-rolled.....	72,243	1.7	93,684	1.6
Cold-finished.....	3,805	2.1	3,673	.9
Pipe:				
Buttweld.....	2,583	.2	3,068	.2
Lapweld.....	3,466	2.1	620	.3
Seamless.....	3,883	.4	1,404	.1
Tubing:				
Electric welding.....	79	.1	54	
Mechanical and pressure.....	316	.2	660	.2
Total.....	1,455,159	7.5	2,317,063	8.3

¹ Includes shipments to all steel-consuming firms which are wholly owned or partially owned (i. e., ownership of 10 percent or more of the voting stock) by a steel company, any of its subsidiary firms, its parent company, or by other subsidiaries of its parent company.

² Total shipments excludes shipments to warehouses and other steel companies for the purpose of further conversion or resale.

Shipments of selected carbon-steel products to warehouses¹

(Net product tons)

	Shipments to affiliated warehouses ¹		Shipments to all warehouses ²		Shipments to affiliated warehouses as percent of shipments to all warehouses	
	1940	1947	1940	1947	1940	1947
Sheets:						
Hot-rolled.....	36,183	172,599	391,005	708,163	9.3	24.4
Cold-rolled.....	10,475	93,022	234,621	403,143	4.5	23.1
Strip:						
Hot-rolled.....	6,254	18,615	39,115	102,350	16.0	18.2
Cold-rolled.....	38	4,078	4,839	25,892	.8	15.7
Bars:						
Hot-rolled.....	197,923	352,236	652,052	1,372,429	30.3	25.7
Cold-finished.....	1,938	7,373	37,452	130,679	5.2	5.6
Pipe:						
Buttweld.....	72,457	253,438	772,138	1,281,778	9.4	19.8
Lapweld.....	17,688	18,310	82,024	129,609	21.6	14.1
Seamless.....	161,907	190,397	488,425	684,275	33.1	27.8
Tubing:						
Electrical welding.....	154	1,283	15,267	46,321	1.0	2.8
Mechanical and pressure.....	1,422	2,718	53,500	157,867	2.7	1.7
Structural shapes.....	79,570	226,348	365,914	904,249	21.7	25.0
Plates.....	61,669	174,424	230,329	655,560	26.8	26.6
Wire products:						
Drawn wire.....	2,386	15,818	107,647	189,998	2.2	8.3
Wire nails and staples.....	11,654	4,229	316,942	474,129	3.7	.9
Barbed and twisted wire.....	1,195	1,187	75,633	122,032	1.6	1.0
Woven wire fence.....	1,177	2,328	135,350	241,887	.9	1.0
Bale ties.....	792	1,188	14,952	36,445	5.3	3.3
Total.....	664,882	1,539,501	4,017,205	7,666,866	16.5	20.1

¹ Includes shipments to all warehouses which are wholly owned or partially owned (i. e., ownership of 10 percent or more of the voting stock) by a steel company, any of its subsidiary firms, its parent company, or by other subsidiaries of its parent company.

² Includes shipments to affiliated warehouses and all other warehouses, jobbers, dealers, and distributors.

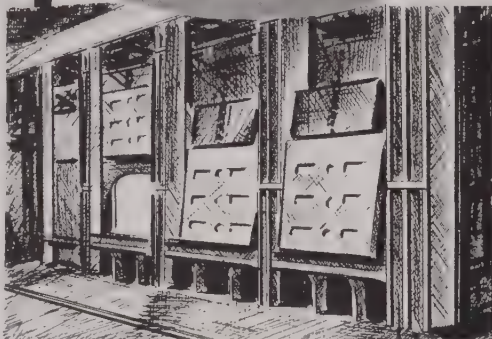
¹⁷ Hearings, pt. 7, pp. 942-943.

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1554 West Liberty Ave. Pittsburgh 26, Pa.

NEWS OF INDUSTRY

Sheet Metal Consumers Score Farm Grain Bin Allocations Program

Philadelphia

• • • Sheet metal contractors, suffering from drastically curtailed light gage galvanized sheet production in the last decade, hit the ceiling when they learned of the proposed allocation of 8400 tons of this product a month to the farm grain storage bin program. Many grain bins throughout the Midwest have been and are now empty or only partly filled, according to J. D. Wilder and E. B. Brown of the Sheet Metal Contractors' Assn., Inc.

Contractors need more light gage galvanized sheet tonnage for hot air ducts to meet the housing program than is currently being made available to them by shipments to warehouses. Contractors buy 90 pct of their sheet tonnage from jobbers. Not more than 5 to 10 pct are able to buy from the mills. They are frankly skeptical of the value of the allocations of 40,000 tons of sheets a month to the warm air heating program when there is so little steel available to fabricate the necessary ductwork.

Mill quotas of galvanized sheets shipped to distributors have been constantly decreasing since the beginning of the war. First quarter quotas are 25 pct less than shipments in the first quarter of 1948, and they are only 37 pct of the average quarterly tonnage in 1941, according to Thomas A. Fernley, Jr., executive secretary of the National Assn. of Sheet Metal Distributors. In the light gages needed for ductwork, distributor quotas have dropped even lower.

Mill capacity for light gage galvanized sheet is now estimated to be only half the 1939 capacity. By 1940, the technological developments in the galvanizing field, when continuous electrolytic galvanizing made it appear that the hot dip method was a thing of the past, served to deter producers from installing new galvanizing capacity.

In the meantime hot dip capacity has been retired without a

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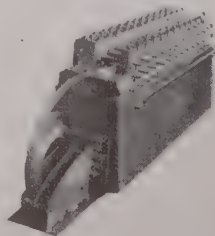
With correctly designed ARDCOR Roller Dies, made of highest grade tool steel, maximum production speeds are assured . . . better products obtained.

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compensating increase in electrolytic capacity. Both Jones & Laughlin and Youngstown Sheet & Tube Co. discontinued galvanized sheet production. The Vandergrift Works of Carnegie Illinois Steel Corp., with a capacity of 147,200 tons of galvanized sheet a year, was converted to silicon sheet and stainless steel production. The Irvin Works was to begin producing galvanized sheets on a continuous line concurrently. But it was more than two years before the Irvin Works got into production.

Light gage steel supply for galvanizing has been taken out of the market chiefly by closing down the old hand mills that rolled sheets in packs, and by the buying of sheet mills by consumers.

The only sheet mill whose production is still available to the market is Niles Rolling Mill Div., Sharon Steel Corp. Sheet mills sold to consumers include Apollo Steel Co., Newport Rolling Mill Co., Mahoning Valley Steel Co., Superior Steel Corp., Canton Ohio; Chapman Price Div., Continental Steel Co., and Wheeling Steel Co.'s Portsmouth, Ohio, plant.

Continuous mills do not generally roll lighter than 18 gage, and cold-rolling is required for the lighter gages. But reports indicate that the bulk of the tonnage from the new cold mill installations is going into the more profitable tinplate products.

Shipments of galvanized sheets reported by the American Iron and Steel Institute do not reflect the more significant shortage of the light gages since these figures are not broken down by gage. But here is an analysis of receipts by gage brackets reported by a segment of the sheet distributors to the National Assn. of Sheet Metal Distributors: Twenty-seven distributors reported that in 1941 they received 18,885 tons of galvanized flat sheet 24 gage and lighter; by 1946 receipts had dropped by 50 pct to 9539 tons; in 1947, 7733 tons; 1948, first quarter, 1721 tons; second quarter, 1221 tons.

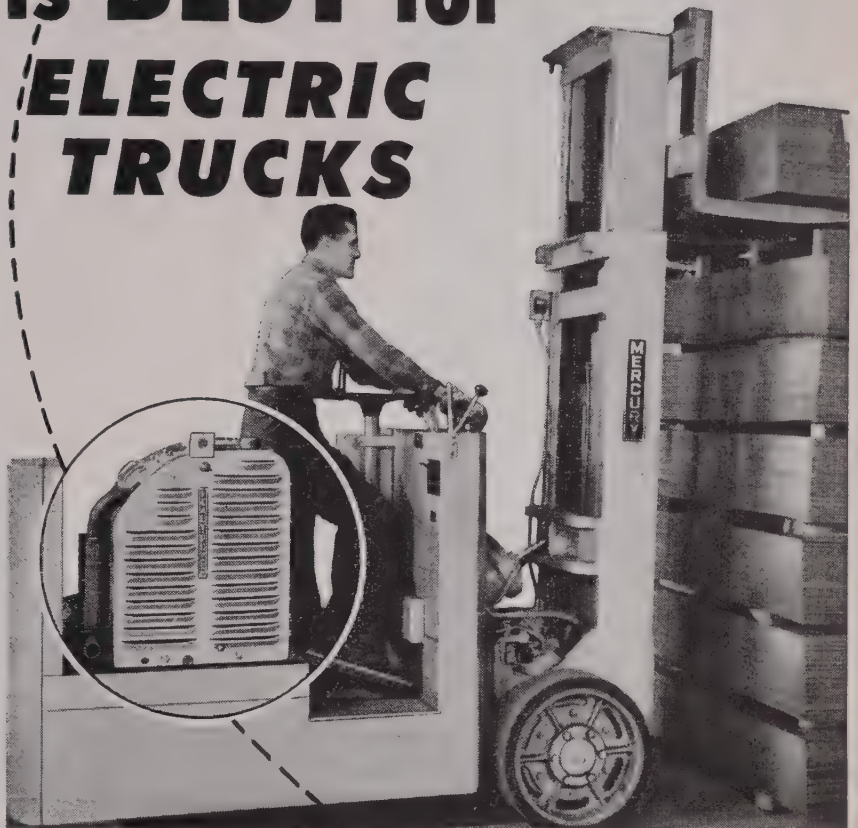
In gages 18 to 23, receipts in 1941 were 4256 tons; 1946, 2353 tons; 1947, 2138 tons; 1948, first quarter, 553 tons; second quarter, 519 tons.

In 16 gage and heavier, receipts

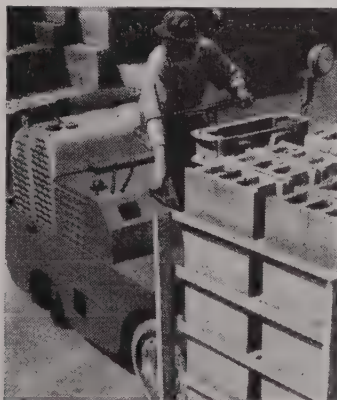
READY-POWER

is ^{*}BEST for

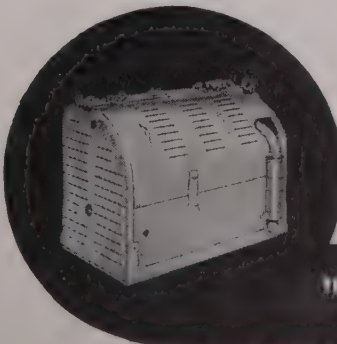
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Known as UNIT DESIGN, this unique method of crane construction reduces your costs in 2 ways.

- 1 LOWERS FIRST COST—Because READING CRANES offer you a choice of several interchangeable motor, control and hoisting units, you buy no "extras" to solve special handling problems.
- 2 REDUCES MAINTENANCE COSTS—All of the operating parts in a READING CRANE are easily accessible for overhaul or repair. The UNIT DESIGN feature makes it possible to remove any one unit without expensive "breaking down" of other units.

See your distributor for information on how you can get a READING CRANE "tailor made" to your own specifications. Drop us a line for your free copy of "The Why and How of Faster Production."

READING CHAIN & BLOCK CORPORATION
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READING HOISTS

in 1941 were 1812 tons; 1946, 734 tons; 1947, 672 tons; 1948, first quarter, 223 tons; second quarter, 256 tons, the only gain reported.

For the past eight months the sheet metal contractors, with the aid of the sheet metal distributors, have sought an allocation for galvanized sheets without success. It is learned that the Office of Industry Cooperation questioned the contracting industry.

When it was found that the industry was made up of many thousands of small firms whose total prewar consumption of galvanized sheets was relatively small, no action was taken on the application. It was suggested that the industry turn to aluminum for ductwork and that there was some prospect of voluntary allocations of aluminum.

Leases Plant from WAA

Washington

• • • A portion of a government-owned aircraft parts plant in Chula Vista, Calif., has been leased for 5 years to its wartime operator, the Rohr Aircraft Corp., Chula Vista, War Assets Administration has announced. The rent is \$5132 monthly in advance.

The portion of the plant leased consists of 13 acres of land and improvements, including six buildings with a combined floor space of about 250,000 sq ft. The property had an acquisition cost to the government of about \$1,000,000.

The Rohr Aircraft Corp. will use the property to produce military equipment for the Dept. of the Air Force. The lease is subject to the national security clause.

Report High Labor Cost

Boston

• • • The Associated Industries of Massachusetts has reported that the closing of 124 manufacturing plants in the state has resulted in loss of work to 13,370 employees during 1948 and that 26,000 more workers have been laid off since the beginning of 1949. "We have reputedly the highest labor cost of any area in the country, save the automobile producing region of the Middle West," the report added.

"LET'S LOOK FOR TROUBLE"



Says
CHIP WRIGHT

"Looking for trouble is a necessary part of efficient operation, because the most efficient shop is one in which troubles are reduced to a minimum.

"A plant honing cylinder blocks was considered to be trouble-free when it was averaging 9.6 blocks per stone and getting a fair finish. However, when a change of honing oil made it possible to hone 15.4 blocks per stone and get a better finish, it was realized that there actually had been trouble before this profitable change was made."

"That's what I mean when I say, 'Let's look for trouble.' Another way of stating it is: 'Where can we find opportunity for improvement?' Frequently the biggest single opportunity lies in the choice of cutting fluids."

—Chip

*The change that improved the honing operation cited above was a mixture of ThredKut 99 recommended by a D. A. Stuart Oil Co. representative. ThredKut 99 is easily mixed or blended whenever a special operation calls for its unusual qualities. Ask for a booklet on D. A. Stuart's ThredKut 99 and other time-tested cutting fluids.

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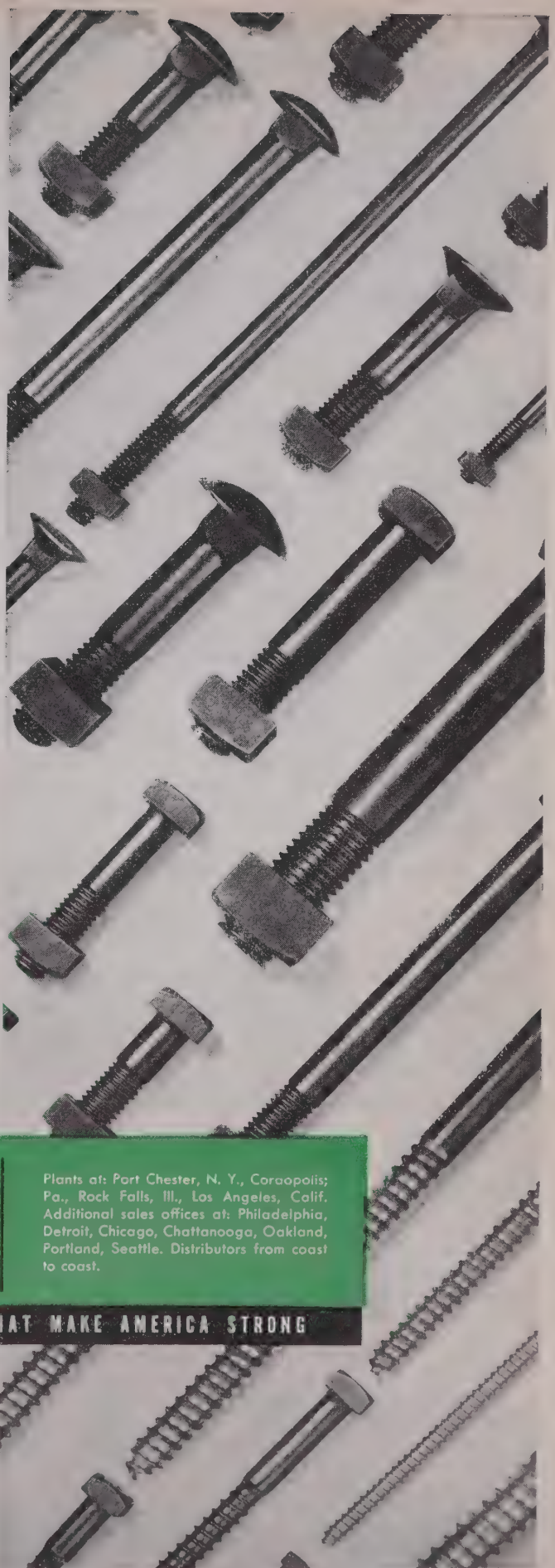
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to coast.



Titan

Hot pressed brass and bronze forgings



Typical forged (hot pressed) brass parts produced by Titan. The parts at the lower right are two views of a machined forging cut through the center to show intricate machining on the inside.

**size range from fraction of
an ounce to 100 pounds**

TITAN presses are capable of forging parts of less than one ounce up to 100 lbs. in weight. Intricate shapes and thin sections are easily produced. TITAN forgings are pressed from extruded stock, which means double hot working of the metal under very high pressures. Double hot working produces a metal structure of superior density, uniformity, tensile strength, yield strength, and machinability.

TITAN Brass and Bronze Forgings have no sandpits, blowholes, or sand particles to impair machining or cause failure under stress or strain. Because of their dimensional accuracy, easy machinability, and elimination of scrap losses, the cost of finished parts is held to a minimum. TITAN forgings are delivered finish machined for assembly or forged and trimmed for machining in your own plant. Write for literature.



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Says Real Steel Profits Are 1.6 Pct, Not 8.7 Pct

New York

••• Net income during 1940-47 of nine steel companies doing 80 pct of the country's steel business would be more than a billion dollars less than the reported amount if the figures were adjusted to compensate for the effects of inflation, according to an analysis by Ralph C. Jones, certified public accountant and member of the economics faculty of Yale University. The findings of Professor Jones were reported in the January issue of the *Journal of Accountancy*.

According to Professor Jones, the adjusted figure of net income for the nine companies for the 8-year period is \$457 million in 1935-39 dollars. He compares this with reported income of \$1638 million in current dollars. On this basis the author finds that, instead of having substantial retained earnings, the companies actually paid dividends out of capital.

"The statements which are not adjusted for purchasing-power changes show \$687 million or 38.5 pct of income retained as additional capital. This tends to support the generally accepted view that when prices are rising business firms have to retain a substantial portion of their profits to finance the replacement of inventories and plant at higher costs. The statements which have been adjusted for purchasing-power changes, however, show not only that no income whatever was retained but also that some \$285 million in excess of income was paid out. . . . What the companies retained was bigger figures on their books and nothing else. The profits could not be distributed because they really weren't there."

The author computes earning rates of the nine companies in 1947 as 1.63 pct in terms of real income, instead of 8.7 pct as reported.

"If, on the basis of generous estimates of real income, the steel industry cannot earn even 2 pct on invested capital in a boom year with high output such as 1947, some widely prevalent ideas about prices, profits and taxes are going to be dramatically changed either

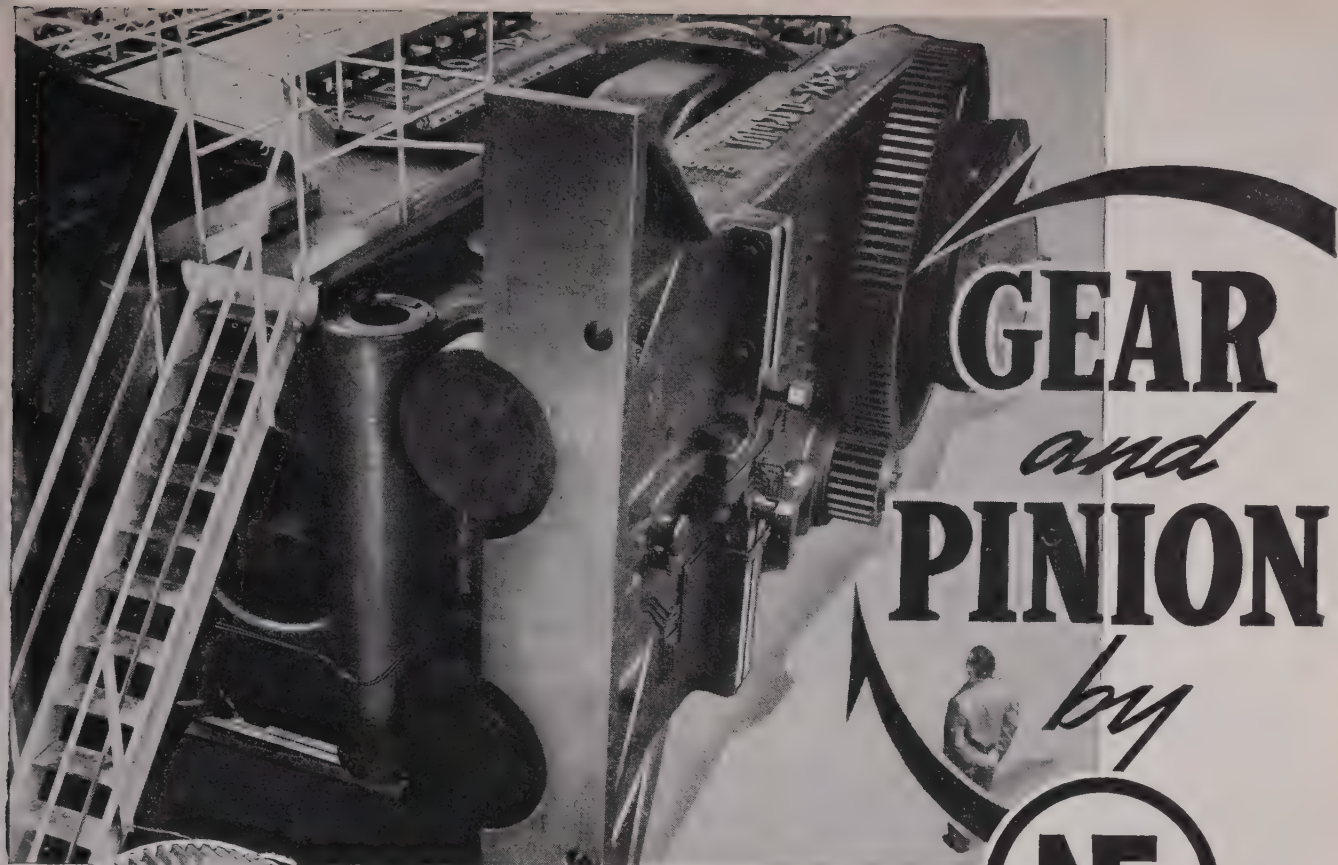


PHOTO COURTESY OF THE NATIONAL MACHINERY CO., TIFFIN, OHIO

GEAR *and* PINION

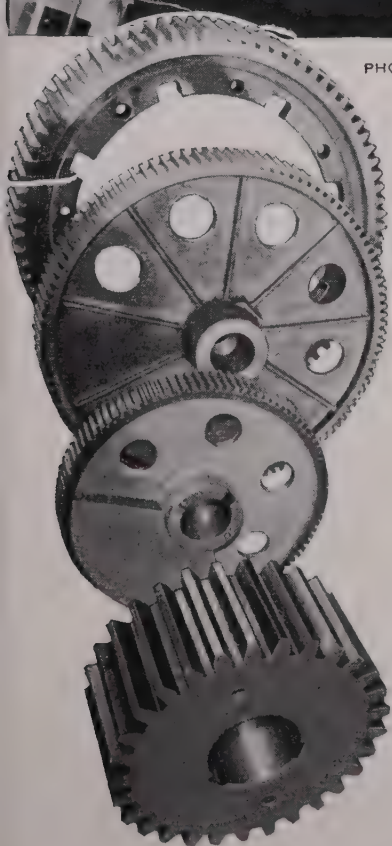
by

NE

A Press so big..

it had to be assembled on it's back!

HERE is the Neloy Alloy Cast Steel Gear and pinion drive of a No. 10 National Machinery Company Maxipres so big it had to be assembled on its back. The large gear is Neloy Molybdenum, Normalized; 190-220 Brinell rough weight 26,130 pounds. The pinion is Neloy No. 3; Alloy Steel, quenched, 202-240 Brinell rough weight 3,480 pounds. Both are 4 inch circular pitch, 16 inch face. Gearing such as this, while not routine production, is taken in stride at National-Erie Corporation where your specification requirements are completely controlled from the raw material to the finished product. Neloy or Neloy Moly, spur, bevel, mitre, Sykes Herringbone, finished gears or blanks are specialties of our Foundries and Machine Shops . . . Send your specifications to us. Bulletin No. 9 gives full details. Write for it.



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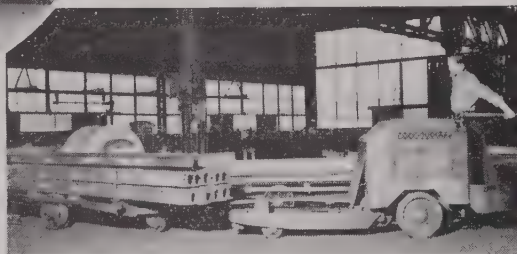


Wherever possible, material is handled on skids. Trucks are rated at 6000 lbs.—but when overloading is unavoidable, the trucks can take it.

For lifting, positioning and carrying heavy, bulky loads inside and in the yard, the Baker Crane Truck is used. It also handles dies, and moves machines up to half a ton in weight.



Long steel rails, too long for skids, are handled on a trailer coupled to the Baker Low-Lift Truck.



Six Baker Trucks keep materials on the move at this busy Cleveland plant. Some of them have been in use for 20 years—and are still handling heavy loads of railroad track switches, crossings, and other track materials, giving the same trouble-free, low-cost, quiet and dependable service as those purchased more recently.

"Before we installed our electric trucks," says Mr. Von Benken, electric maintenance engineer, "we employed about 70 hand truckers—but the trucks enabled us to transfer them to productive work. One electric truck is now doing the work of 12 men with hand trucks."

The trucks are required for constant service during the 8-hour day—lubrication, battery charging, and the occasional maintenance needed being done when the plant is idle.

"It would be difficult to imagine how we could run our plant without such sturdy material handling equipment," adds Mr. Von Benken. "We depend on these trucks."

Let the Baker Material Handling Engineer show you how dependable BAKER Trucks can cut your handling costs.

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Baker INDUSTRIAL TRUCKS

through reason and understanding or from economic shock. . . . Inadequate real profits will neither supply nor attract the capital needed for new tools with which steel can be produced more efficiently. It is a serious question for employees and their representatives as well as for management. If wage increases and excess profits taxes come out of profits now, will the employees in 10 years be working for an unprofitable, undercapitalized and inefficient industry? Or a nationalized industry?"

Plans for Metal Show

Cleveland

• • • The 1949 Metal Congress and Exposition will be held in the Public Auditorium here, Oct. 17-21, according to W. H. Eisenman, national secretary of ASM and managing director of the event.

Mr. Eisenman said floor plans for the Cleveland show will be in the hands of previous exposition exhibitors Feb. 1. Space assignments will be made Mar. 12.

He said details for handling a record breaking attendance of men in the metals industries have been worked out and that many companies plan to demonstrate, not only their new products and services, but also effective means of further contributing to lower production costs.

The Metal Show will require the entire space of both floors of the Public Auditorium as well as all of the area underground—250,000 sq ft.

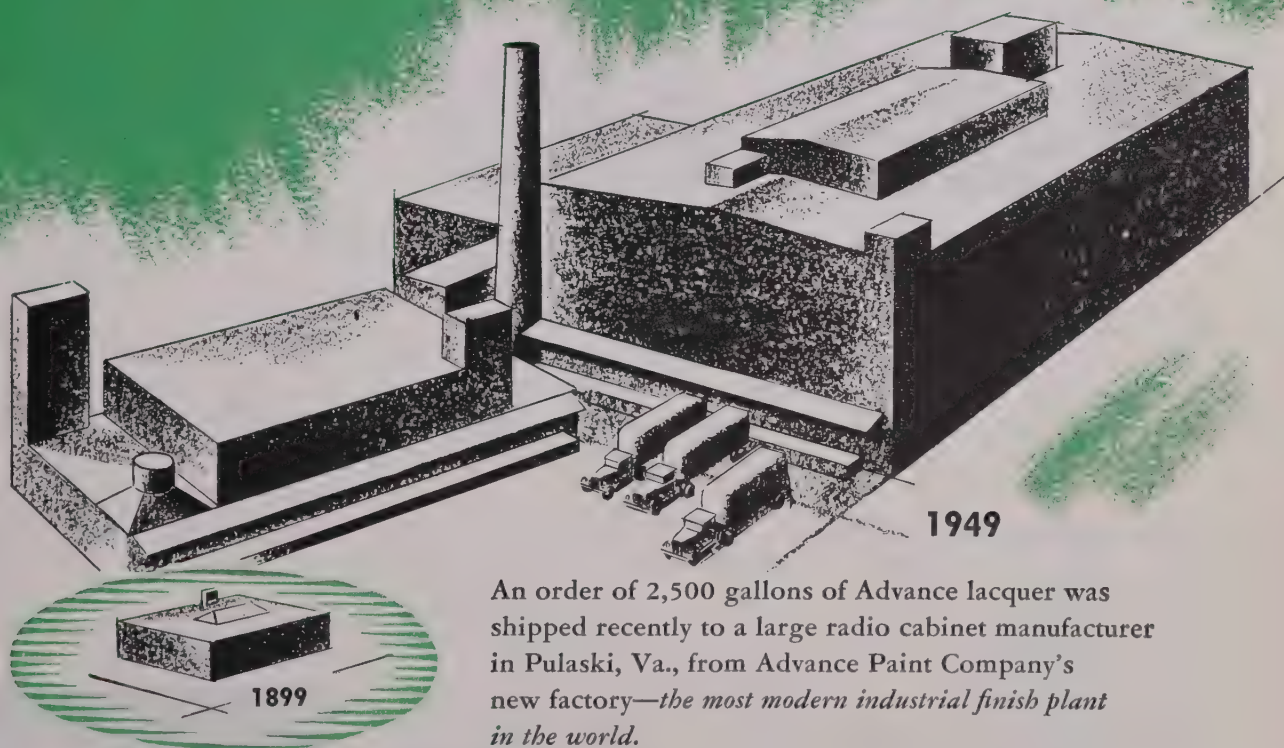
The Housing Bureau has been set up and is functioning under direction of Mrs. Louise D. Perkins, at the bureau's permanent address, 511 Terminal Tower, Cleveland 13.

Reports Net Income

Chicago

• • • A. M. Castle & Co., steel warehouse, reports that the net profits for last year were \$1,486,601 compared with \$1,459,701 for the year 1947. These are the figures after provision for all charges, including reserve for possible future inventory price decline. On a per share basis profits were equivalent to \$6.19 for 1948 compared with \$6.08 in 1947. Total dividends paid during 1948 were \$3.75 per share.

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An order of 2,500 gallons of Advance lacquer was shipped recently to a large radio cabinet manufacturer in Pulaski, Va., from Advance Paint Company's new factory—the most modern industrial finish plant in the world.

This shipment marked the beginning of better finishes and better service for Advance customers. The new factory utilizes the latest methods of product control, complete gravity-flow processes and equipment designed especially for this plant . . . increases manufacturing facilities six times.

Advance designed its new factory on the basis of 50 years experience in formulating finishes to the requirements of specific jobs. Plan your production schedules around Advance's ability to meet your finish requirements faster.

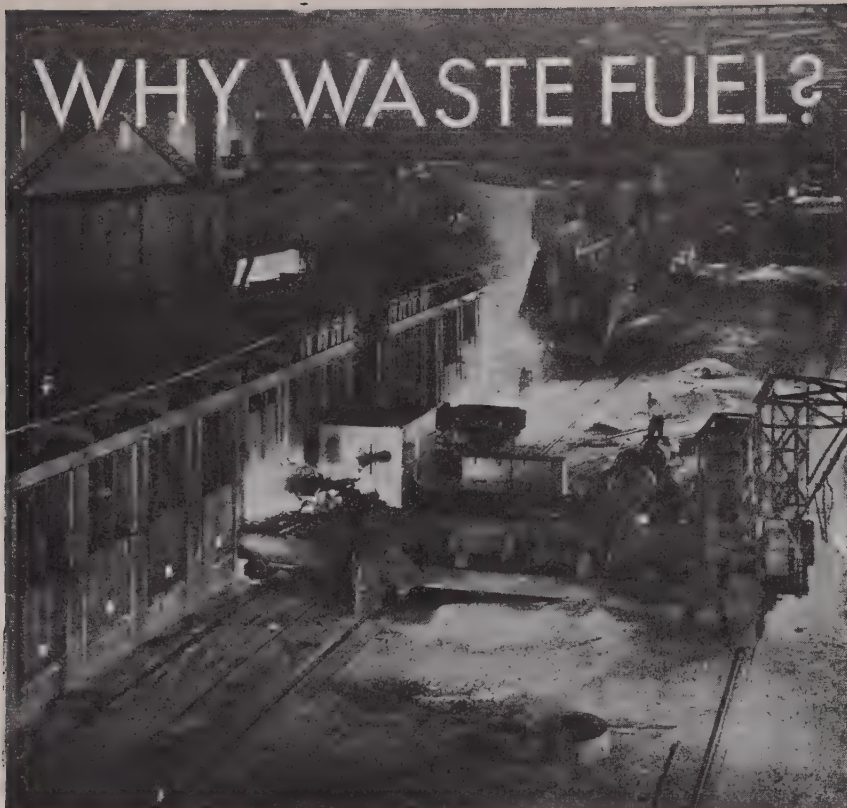


Advance

Manufacturers of Industrial Finishes

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WHY WASTE FUEL?



Therm-O-flake *prevents waste* BY REDUCING HEAT LOSSES...

MORE THAN 25% of Open Hearth fuel can be wasted through heat lost through brickwork and heat absorbed by cold infiltrated air.

Therm-O-flake INSULATIONS are designed to reduce heat losses and seal furnace walls against cold air infiltration. These are used regularly on hundreds of open hearth furnaces and save steel producers thousands of fuel dollars daily.

Therm-O-flake ENGINEERS will prepare an accurate fuel economy survey of existing furnaces in your plant and submit complete thermal data and recommendations for safe maximum insulation of any open hearth furnace, on request.



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Exclusive Manufacturers of

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open hearth insulation

Discusses Retort Drying

Pittsburgh

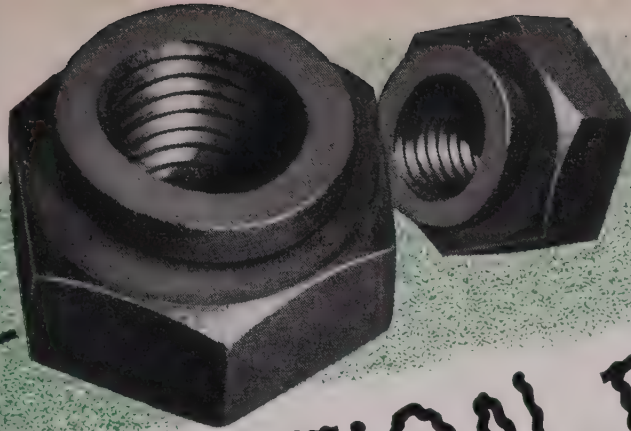
• • • Principles of controlled drying can be beneficially applied to the manufacture and quick testing of the clay retorts used in the production of zinc by distillation, according to R. R. Furlong and D. H. Wertz, of the Donora Zinc Works of the American Steel and Wire Company in Donora, Pa. Mr. Furlong is foreman of the Pottery Department and Mr. Wertz is ceramic engineer of the plant.

Presenting the results of planned studies before the annual meeting of the American Institute of Mining and Metallurgical Engineers in San Francisco from February 14-17, the authors described how the drying cycle of the freshly extruded retorts has been reduced from 45 days to 4 days with assurance that drying conditions can be duplicated. This latter feature is described as extremely valuable in the rapid testing of new retort mixtures.

The controlled drying process depends upon the circulation of a large volume of conditioned air at low velocity. Retort losses using the controlled drying process have been reduced to less than 1 pct. This is about half the normal loss expected with the former slow-drying practice.

THANK YOU: Mr. P. A. Graunke of the E. L. Essley Machinery Co. is shown receiving a welcome booklet from Scully-Jones & Co. receptionist, Marie Dedina. Issuance of such booklets is the company's approach toward making plant visitors feel more at home.





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Tests at 600°F. and -40°F. prove that neither heat nor cold materially affect their holding power. They are also unaffected by steam, oil or water.

Manufacturers of machinery, earth moving equipment, pumps, trucks and other products subjected to severe vibration have found Lamson Lock Nuts the ideal solution to their fastening problems.

Write *today* for additional information.

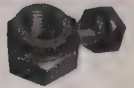
THE LAMSON & SESSIONS COMPANY

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"One Dependable Source for All Fastener Needs"

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1035" CAP SCREWS	MACHINE BOLTS	CARRIAGE BOLTS	COTTER PINS

on any of these fasteners?
CHECK—and CLIP this strip.



LAMSON LOCK NUTS: Economical, vibration-proof. Can be re-used repeatedly.



"1035" SET SCREWS: Cup point type, hardened, heat-treated.



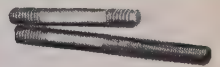
COTTER PINS: Steel, Brass, Aluminum and Stainless Steel.



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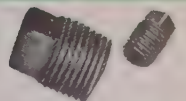
MILLED STUDS: Concentric, accurate, in a full range of sizes.



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NAME _____

POSITION _____

COMPANY _____

STREET _____

Study Profit Sharing

New York

••• Results of a survey by the National Industrial Conference Board on worker profit-sharing plans during the past year indicates that there is a growth of the deferred-distribution plan in the profit-sharing movement.

The board found that these plans fall into two general classifications. Under the first, profits are paid in cash at regular intervals. In the second, the employees' share of the profits is deposited in a trust, from which the employee nor his beneficiaries receive any share until some time in the future; termination of employment, disability, retirement or death.

Plans such as these are more prevalent in small and medium-sized establishments than in the larger plants. There the worker may be in a better position to see the connection between his actions and the profitability of the business.

Unions have traditionally opposed deferred benefit plans, but recently several have been inaugurated at the request of unions. The board found few profit-sharing plans (8 pct.) incorporated in union agreements.

Leases Small Arms Plant

Salt Lake City

••• Part of the small arms ammunition plant operated here during the war by Remington Arms Co. has been leased by Eitel-McCullough Co. of San Bruno, Calif. for conversion to the manufacture of radio and electronics equipment.

Eitel-McCullough operated a war plant in Salt Lake City during the war but that facility was later transferred to the state of Utah and is being used by the state highway department.

The small arms ammunition plant, built by the government at a cost of 30-odd million dollars, was purchased by a group of Salt Lake City investors who are converting it into an industrial center.

Eitel-McCullough expects to complete the conversion job in about 90 days and get into operation in late April or early May.

No. 308-7PD Littell Heavy Duty Continuous Straightening Machine shown with No. 5 Automatic Centering Reel. Capacity, $\frac{1}{8}$ " x 12" wide coiled steel.

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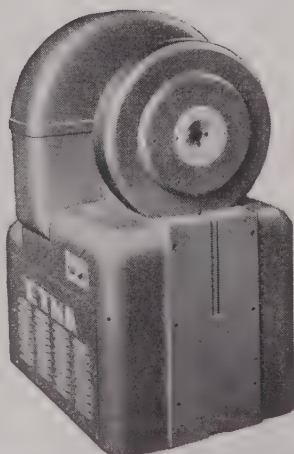
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Industrial Electric

Power Shortages Are
Expected Till Spring

Washington

• • • Electric power shortages for industrial use until spring are as certain as death and taxes, according to the latest findings by the National Security Resources Board. A steady improvement is seen from then on.

Insufficient generating capacity is the reason. With the possible exception of water, there is apparently no threat of shortages in energy for plant operation. As of Jan. 1, 1949, utility systems had sufficient coal stocks on hand to see them through March; fuel oil supplies were sufficient for at least 10 weeks.

On the other hand, installed capacity of the nation's electric generating systems was rated at slightly above 55 million kw. By stretching facilities to the utmost, the annual production rate is running at about 280 billion kwh.

This is still not enough for peak periods, although the overall rate is 10 pct above a year ago. Production by water power, about 25 pct of the total production, has not shown any gain above last year because of low water in some regions.

The anticipated shortages for the remainder of the winter will have little effect on current for home use. It is the industrial users who must take the beating. Already, brown-outs have been put into effect in some areas and more are in the offing for others.

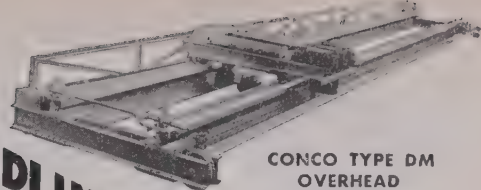
Voluntary customer curtailment, however, will fall short of needed reductions during emergency periods. Last year, the Federal Power Commission estimates, the maximum load reduction from all methods amounted to about 1.3 million kw or 2 pct of capacity. Voluntary customer curtailment accounted for less than 10 pct of the total while shut-offs by the utilities to interruptible customers accounted for another 60 pct.

Although the NSRB is gloomy over prospects for the remainder of the winter, its second and latest survey of the power situation says early summer should see a turn for the better.

More specifically, it anticipates much less serious power shortages for the winter of 1949-50. It further predicts, on the basis of

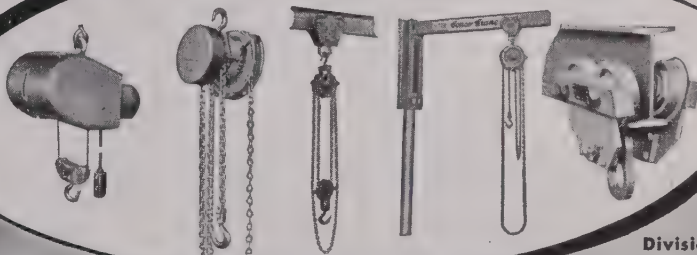
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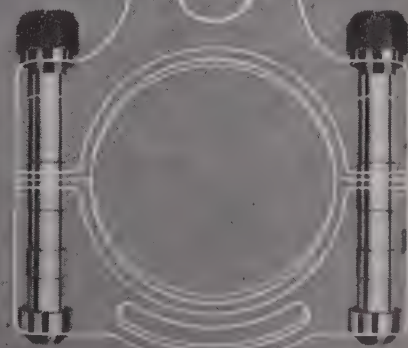
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projected expansion plans, that with a single exception there will be an adequate supply for most uses by the end of 1951.

All bets are off, the Board makes clear, should there be any let-up in present plans of the nation's utility systems for expansion of electric power facilities.

If these are carried to completion, by the end of 1951 the country's power plants will have a capacity of 72 million kw or better. This would mean increasing present capacity by 18 million kw over a 3-year period. Present capacity, according to the Federal Power Commission, is about 54 million kw (producing about 280 billion kwh annually).

The exception to the NSRB's rosy outlook is the Pacific Northwest, particularly should dry seasons make the water shortage more acute over the next 2 years.

It is in this region, perhaps, that industrial users are now being hit the hardest. Steel and aluminum plants are already feeling the pinch in a painful manner.

Industry has expanded in the region until it now requires about 15 pct of the nation's total electric power at peak periods. Depending on the water supply, anticipated power shortages being faced are estimated variously from 150,000 to 450,000 kw. Moreover, a minimum of 200,000 kw in new requirements are waiting to be cut-in on expected new power facilities under construction.

In view of these conditions while the NSRB expects the power supply to be reasonably adequate by 1951, it likewise estimates that there will not be sufficient reserve capacity much before 1953. By then, at the present rate of expansion, the Board figures the productive capacity should be about 95 million kw.

The Board's interest is concerned with making sure that capacity at all time is sufficient to provide for national defense in an emergency. The margin of surplus capacity needed is generally accepted as about 20 pct. Recently it has been nearer 5 pct.

Meanwhile, orders for electrical equipment for power purposes have been pretty well taking up the industry's fabricating capacity. Already operating above pre-war capacity and with expansion programs underway, most such

manufacturers are booked far ahead of production.

Nevertheless, the Board says, here and there are to be found soft spots and some idle capacity. It recommends that government and industry should get together and find a way to make use of it.

Some of this unused capacity is said to be in the field of hydraulic turbines and water wheel generators. If orders could be placed in such spots, deliveries could be made in 1950.

Likewise, the survey indicated, there has been some available fabricating capacity in the line of smaller steam turbine generators having a rated capacity of 10,000 kw or less.

Steel Companies Spent Record Sums Improving Production Facilities

New York

• • • Companies of the iron and steel industry spent a record amount, totaling \$583,000,000 during 1948 to expand and improve their production facilities, according to American Iron and Steel Institute.

Even more money will be spent this year, the Institute said. The expenditures will be raised to a total of \$627,000,000.

A total outlay of more than 2 billion dollars will have been made by the end of this year for postwar expansion and improvement. At that time it is expected that annual steelmaking capacity will be at a record high level exceeding 98,300,000 tons. An additional 500,000 tons will be added in 1950.

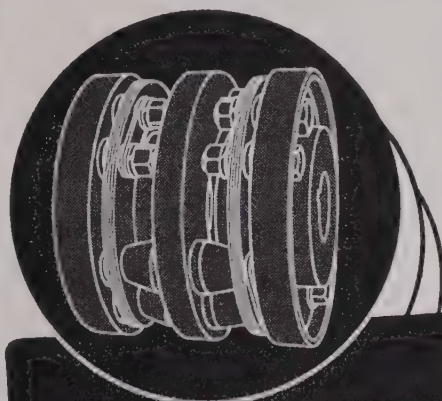
The huge total outlay last year enabled the companies to increase their combined steelmaking capacity by more than 1,887,000 tons. In addition to constructing and improving steel furnaces, the companies increased the capacities in their blast furnace, coke oven, and other raw material departments and added to processing and finishing facilities in order that the additional raw steel could be made into usable finished products.

This year's plans for a record outlay of \$627 million will increase steel capacity by about

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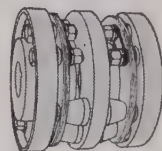
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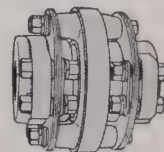
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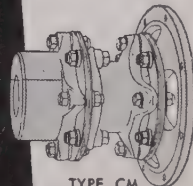
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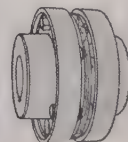
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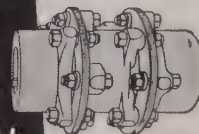
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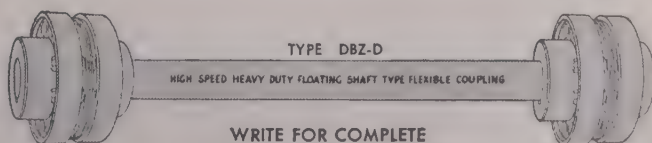


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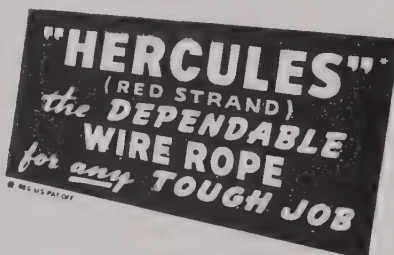
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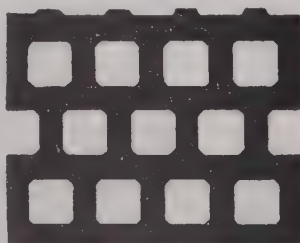
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2,200,000 tons, and provide necessary facilities to roll that additional steel into finished products.

The Institute cited a comparison to illustrate the sharp increase in the cost of expanding and improving facilities. The amount spent last year, when 1,887,000 tons of capacity was added, was more than four times greater than 10 years earlier when about 1,600,000 tons was added to raw steel capacity with the companies' expenditures totaling only \$140 million.

Trailer Manufacturers Hold Annual Convention

Edgewater Park, Miss.

• • • The Truck-Trailer Manufacturers Assn. at the concluding session of its eighth annual convention reelected Harrison Rogers of Rogers Brothers Corp., Albion, Pa., as its president for the current year.

Other officers elected at the close of the 3-day convention on Jan. 19 were W. E. Grace, Hobbs Mfg. Co., Fort Worth, Texas, eastern vice-president; John C. Bennett, Utility Mfg. Co., Los Angeles, reelected western vice-president; and C. A. Persinger, Wilson Trailer Co., Sioux City, Iowa, treasurer.

Mr. Rogers, in his annual report, forecast greater sales of trailers due to increased use of truck transportation, shorter hauls brought about by f.o.b. mill pricing, and dispersal of plants for security reasons.

His forecast was borne out in the concluding address by E. J. Lucas, sales manager, Kingham Trailer Co., who predicted that in 1949 the industry would increase trailer output by 15 to 20 pct.

Colonel David J. Crawford, Commanding Officer, Detroit Arsenal, told the group that the merger of the armed forces may be expected "to simplify the task of the truck-trailer manufacturing industry in fulfilling its share of the national defense program." Colonel Crawford pointed out that trailer makers will have only one major agency with which to deal in regard to procurement matters.

The trailer industry was urged to join with their suppliers and other automotive manufacturers and with users of motor freight

equipment, in an address by J. L. Snead, Jr., vice-president of operations and maintenance, Consolidated Freightways, Inc., Portland, Ore., in order to develop design standards which would facilitate vehicle interchange, improve safety factors and reduce vehicle maintenance and servicing costs.

H. D. Horton, president of the American Trucking Associations Inc., told the convention that the government's policy of tightening bank credit to curb inflation will create new financing problems for the trucking industry, already hampered by its inability to obtain low rate, long-term financing for equipment purchases.

The trailer producers were also presented with an optimistic forecast of steel output for 1949 by Eugene J. Hardy, Washington Editor, THE IRON AGE.

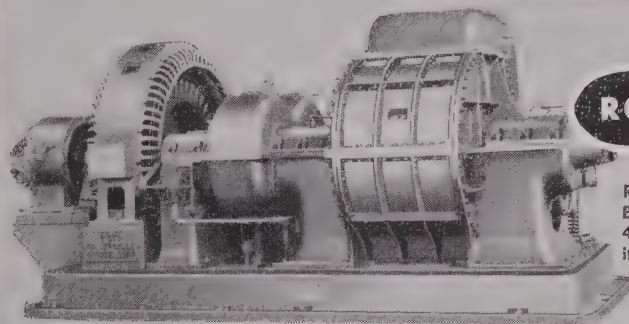
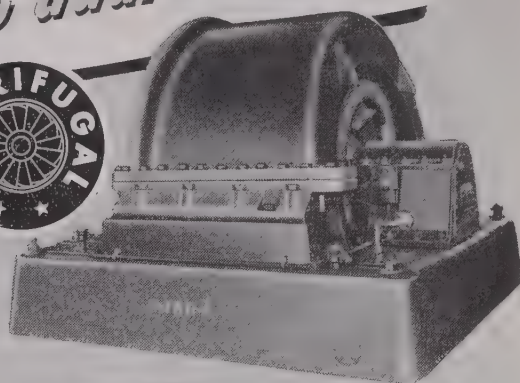
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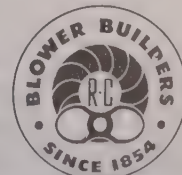
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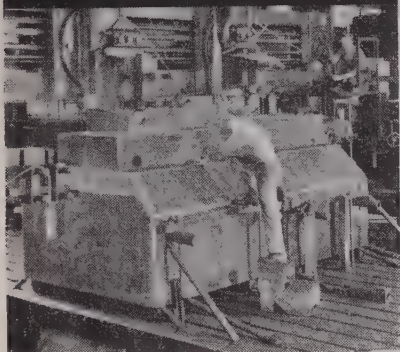
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NEWS OF INDUSTRY

RFC Studies Lone Star Steel Request of Loan After Truman's Speech

Washington

• • • The Reconstruction Finance Corp. is studying the first request from a steel producing company for an expansion loan based on the recommendations contained in President's Truman's State of the Union message.

The first request—for \$65 million—came from the Lone Star Steel Co.

RFC is seeking to determine if it has authority to act on Lone Star's request. Under existing law, RFC is empowered to match funds obtained from private credit sources in the event that the prospective borrower is unable to obtain all his needed capital from private sources.

But Representative Patman, D., Tex., has indicated that the requested \$65 million represents the total anticipated outlay for expansion and improvement of Lone Star plant and equipment.

If RFC finds, after studying Lone Star's application, that this is the case, the lending agency will be powerless to grant the requested loan unless Congress revises the statutes under which RFC operates.

Patman declared that "there is at least a 10 million ton shortage of steel in our economy annually." This, he said, could be made up in the southwest area. "We have the ore, the coking coal, the limestone, and the manganese," he stated.

Lone Star is now producing 1000 tons of pig iron a day from local raw materials and is making \$350,000 a month after taxes, Patman asserted.

Weather Halts Operations

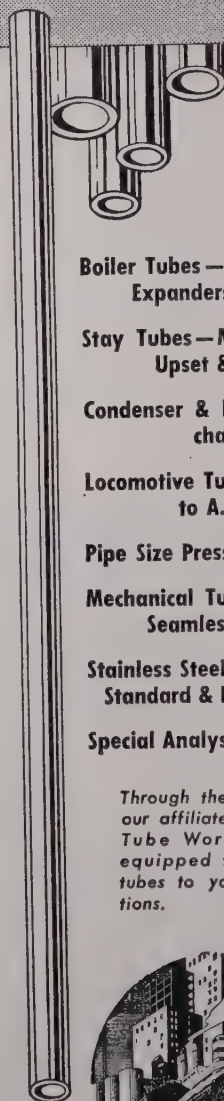
Salt Lake City

• • • Foundries, machine shops and other local industries last week were trying to operate in frigid weather without gas supplies because of the heavy demands for home use. Only persons happy over the shortage were the 25,000 children in northern Utah who were "forced" to stay home because there was no gas with which to heat their schools.

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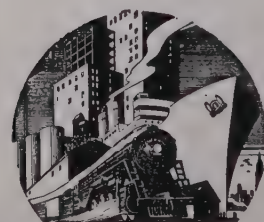
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Information Center For Army Procurement Opens

Washington

• • • A Procurement Information Center has been established in the Office of The Assistant Secretary of the Army to supply information concerning Army procurement of supplies and equipment.

Information concerning current Army procurement programs, submission of bids, buying and purchasing offices, and abstracts of bids will be made available at the Procurement Information Center.

Prospective bidders and manufacturers interested in securing information may write directly to the center, make telephone inquiries or call in person at the Office. The telephone number of the Procurement Information Center is Republic 6700, extension 4327. Letters should be addressed to the Procurement Information Center, Office of The Assistant Secretary of the Army, Room 4E789, National Defense Building (The Pentagon), Washington 25, D. C.

The establishment of this information center was the result of the growing need for one place in the Department of the Army where members of legislative bodies, other government agencies and business, both large and small, can go to obtain information concerned with the procurement activities of the Army.

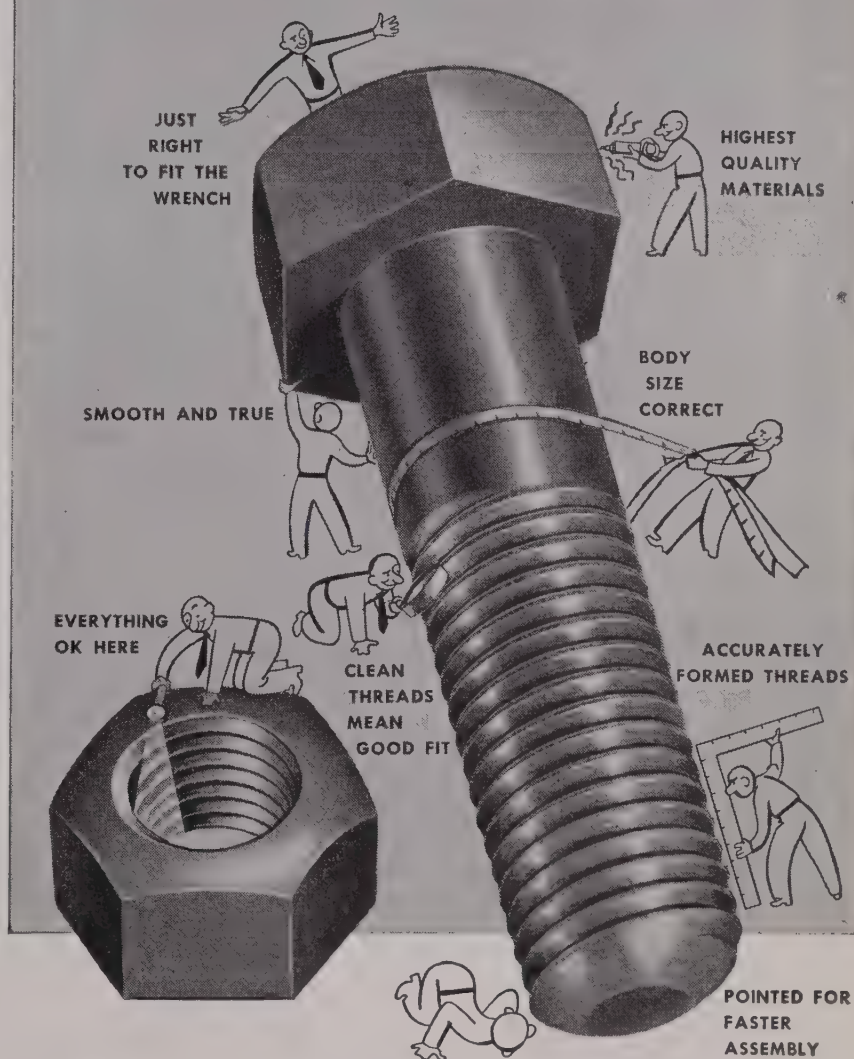
Speaks on Pipe-Making

Pittsburgh

• • • The latest developments in the manufacture of continuous-weld pipe was discussed by Harold R. Beachler, Etna (Pa.) works manager, Spang-Chalfant Div., the National Supply Co., at a meeting of the Georgia Engineering Society, held recently in Atlanta. He included the advantages of a new high-speed 10-stand continuous mill now being installed at Etna and gave a historical resume of past pipe-making methods and equipment in this, the oldest operating, pipe mill in America.

The discussion covered recent innovations in finishing operations, such as straightening and testing and machine tool equip-

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CTM Elects Officers

Detroit

• • • Emil Gairing, president Gairing Tool Co., was elected president of the Cutting Tool Manufacturers' Assn. at the fifth annual membership meeting. He succeeds D. E. Van Deusen, president and general manager, Kelly Reamer Co., Cleveland. Norman Lawton, works manager, Star Cutter Co., Detroit, was elected vice-president; R. S. Spencer, president, Detroit Boring Bar Co., was elected treasurer and Harry J. Merrick continues as executive secretary of the association.

Those elected to serve on the board of directors for the next 3 years were Walter F. Fuller, president, Fuller Tool Co., Detroit; E. J. Kaiser, manager, Davis Boring Tool Div., Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.; R. S. Spencer, president, Detroit Boring Bar Co., Detroit, and Robert H. Wolfe, vice-president, Arrow Tool & Reamer Co., Detroit.

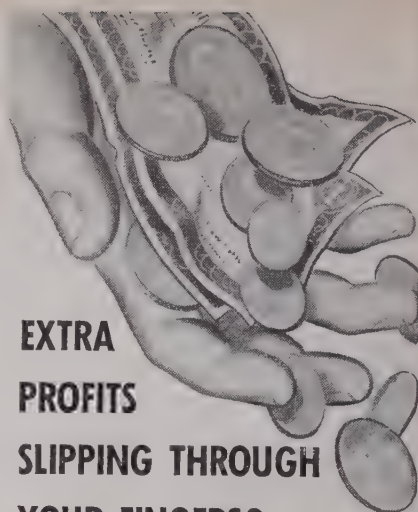
Elects Regional Officers

Chicago

• • • Chicago Chapter, Steel Products Warehouse Assn., Inc., at its regular monthly meeting held recently elected the following regional officers for certification to the forthcoming spring conference of the national organization: Sol Fox, Universal Sheet & Strip Steel Co., president; P. A. Riskind, Chicago Metals Co., vice-president; H. A. Greenberg, Western Sheet Steel Co., treasurer and D. L. Friedman, Friedman Bros. Steel Co., secretary.

Elected regional representatives on the board of trustees of the association were: Mr. Fox, Harry F. Alpirn, Briggs & Turivas; and Mr. Riskind, alternate.

Clayton Grandy, president and executive-secretary of the association, Cleveland, addressed the meeting on current and prospective conditions affecting steel warehousing.



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PORTABLE CONVEYOR
CUTS HANDLING COSTS!**

ATTACK ever-rising costs at one of the most important points . . . handling costs! Buschman "Roll-or-Wheel" Portable Conveyors—exceptionally versatile and low in cost—have made savings of 30% and more in handling costs for hundreds of users. Available in 5 ft. and 10 ft. straight and curved sections with stands, 3-way switches and other accessories. Your Buschman Representative will gladly show you how to turn handling costs into extra profits with Buschman Conveyors. Write for Bulletin No. 10 today. Representatives in principal cities.



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Conveyors**

THE E. W. BUSCHMAN CO., INC.

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Cincinnati 32, Ohio

ASF Elects Officers

New York

• • • Thomas Drever, formerly president of the American Steel Foundries, was elected chairman of the board at a meeting held here recently, according to Oliver E. Mount, secretary and treasurer of the organization.

Other changes in officers made at the meeting were as follows:

C. C. Jarchow, formerly vice-president, was elected president to succeed Mr. Drever.

C. E. Grigsby, formerly assistant vice-president, was elected vice-president.

L. T. Moate, formerly assistant to the controller, was elected controller.

Nuclear Fission in Fuels

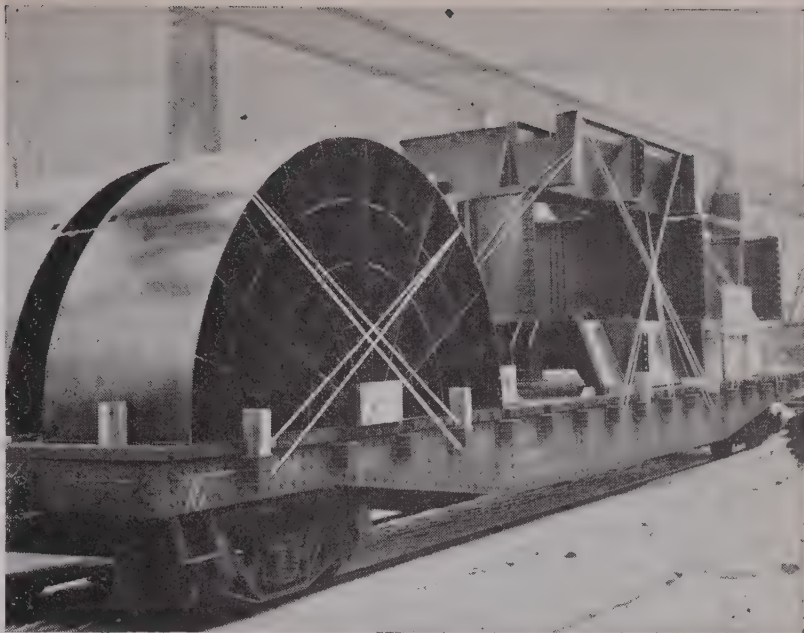
San Francisco

• • • Nuclear fission is now being used to improve automotive fuels by the California Research, Corp., Standard Oil of Calif.'s research organization.

A radio-active piston ring which had been activated in an atomic pile at the Oak Ridge National Laboratory is placed on a piston in a test engine and after 3 or 4 hr of operation a sample of oil is taken to determine by means of a Geiger counter just how much metal has been worn from the activated ring. By this method the amount of wear can reportedly be measured so accurately that as little as one millionth of an ounce of metal worn from the rings would be detected.

Purpose of such test is to determine the effectiveness of lubrication with the ultimate aim of increasing engine life by improved lubrication.

Oil shipments through long pipe lines are also being traced by the use of radioactive materials in oil which can then be followed with a Geiger counter. Refineries are also using radioactive carbon to find out what happens to the molecules of gasoline as they pass through the plant.



*Effective... safe
... inexpensive*

GERRARD Round Steel Strapping

• This carload of pre-heating equipment was quickly, firmly and safely secured with Gerrard Round Steel Strapping. Gerrard Strapping is convenient to use. Every Gerrard machine tensions the strapping, forms its own twisted seal, trimmed smooth with no exposed ends. The binding operation is simple and rapid, saves valuable time.

Gerrard Steel Strapping helps you cut costs, too. In many cases its use has reduced material costs 30 to 50 percent.

And the Gerrard method gives unrivaled protection. Packages are securely bound into rigid, pilfer-proof bundles. In crates, cartons, palletized loads and carload lots of steel pipe, sheets and machinery, torsional sway is practically eliminated and damage claims are sharply reduced.

The services of Gerrard engineers are available *without charge* to help you solve your packaging problems. Write for free copies of *Blue Book of Packaging* and *Red Book of Carload Stowage*.



GERRARD STEEL STRAPPING COMPANY

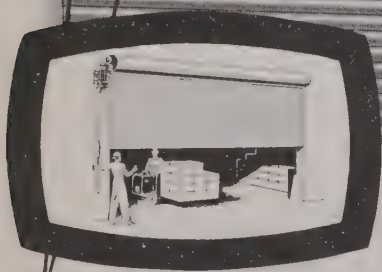
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4705 So. Richmond St., Chicago

UNITED STATES STEEL

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Steel Rolling Doors save space, time, money

Kinnear Rolling Doors *save space* by opening straight upward and coiling above the doorway. All floor and wall areas around the door, *inside and out*, are fully usable at all times. Their easy, gliding action *saves time*. For maximum efficiency, Kinnear Motor Operators, controlled from any number of handy push-button stations, may be added. In addition, Kinnear Rolling Doors *save money*; their rugged, all-steel interlocking slat curtain assures long life, low maintenance and extra, low-cost protection against fire, intrusion, wind or accidental damage. Built to fit any doorway. Write for details.

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Offices and Agents in all Principal Cities

Reports '48 Mining Death Rate Lowest on Record

Washington

• • • American mining deaths and injuries in 1948 were at their lowest rates in 38 years of record-keeping, the Bureau of Mines reports.

Coal mine fatalities totaled 1015 (870 in bituminous) last year, 150 less than 1947 while non-fatal injuries amounted to 54,100

or 4100 less than 1947. In metal mines and pits 125 were killed and 8200 injured; totals for non-metallic mines and quarries were 85 and 6500.

Six major disasters (five or more deaths) occurred in bituminous mines during the year and resulted in a total of 49 deaths.

Complications by the bureau indicated the year's production at about 594 million tons of bituminous and 57 million tons of anthracite.

To Build New Soaking Pit

Coatesville, Pa.

• • • Approval of an appropriation of \$266,000 to cover the cost of a new soaking pit to replace two regenerative pits which have been in service for more than 30 years has been voted by directors of Lukens Steel Co., Coatesville, Pa., according to Robert W. Wolcott, president. The new construction is to start immediately and is expected to be completed in 3 to 4 months.

The new equipment will greatly facilitate the conversion of ingots and slabs and the rolling of plates on Lukens' 140-206-in. mills, Mr. Wolcott said. When completed the new facilities should show a decrease in heating delays and in the production of greater quantities of ingots as well as larger ingots, and at the same time provide greater heating economy, he reported. The new soaking pits may be fired with either natural gas or oil. They will duplicate the type and style placed in operation for this mill unit last year.

Jet Caster Speeds Top Hole Opening

(CONTINUED FROM PAGE 85)

explosive, such as the 2-oz charge used in the blast furnace jet caster, become capable of punching (instantaneously) a hole the size of one's little finger through 8 in. of cold cast iron. This type of charge became quite widely known during World War II as the business end of the antitank weapon called the "bazooka."

The new method of tapping involves drilling or digging out the tap hole in the usual manner, placing the jet caster up against the crust of the iron notch with some means such as a wooden pole (as shown in fig. 2) and detonating the charge with a blasting cap placed at the rear of the cone. This procedure removes one of the most hazardous features of casting, since the operator moves away from the path of the metal before detonating the blasting cap. The jet caster is so insulated that it is unaffected by the high temperature of the tap hole for at least 3 min, thus giving the operator

plenty of time to place and fire the capsule. If, after placing the capsule, it is decided not to tap the furnace, the heat of the tap hole will cause the explosive to "cook off" harmlessly within 7 min. This low-grade detonation has no effect on the hole.

Only a limited number (about 40) of test firings have been made on the openhearth and blast furnaces at Republic; nevertheless, results have been encouraging. During a test of 20 consecutive casts made on a blast furnace, it was noted that the blast furnace hole depth was more constant, and faster flows of iron were obtained than when compared with results when using oxygen lances. No hole damage was noted. Similarly, when openhearth tests were made, the tap hole structure appears to be better maintained. Instantaneous and faster casts were made, resulting in less skull and better pouring practice.

It is too early to draw conclusions concerning this method; however, duPont is now manufacturing 500 blast furnace and 500 openhearth charges for exhaustive tests to begin in April at Republic Steel Corp.

Four Executives Get Certificates of Merit

Detroit

••• The President's Certificate of Merit, highest civilian award, has been given to four of General Motors' top executives.

Recipients of the award are: GM executive vice-presidents O. E. Hunt and Harlow H. Curtice; Edward F. Fisher, a member of the board of directors, and Hugh Dean, manufacturing manager of the Chevrolet Motor Div. Mr. Hunt was honored for his work in connection with the mass production of aircraft equipment. Mr. Curtice directed the manufacture and production of aircraft engines and parts at the Buick Motor Div. during World War II.

Mr. Fisher was wartime general manager of Fisher Body Div. which produced major assemblies for B-17, B-25 and B-29 planes and aircraft flight instruments.

The Certificate of Merit was awarded to Mr. Dean for his direction of manufacturing and mass production of aircraft engines at Chevrolet.

The awards were presented by Maj. Gen. K. B. Wolfe, Director of Procurement and Industrial Mobilization Planning, Air Materiel Command, Wright Field, Ohio. The ceremonies took place in the executive dining room of the General Motors Bldg., in Detroit.

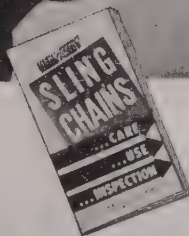
Foundry Materials Ease But So Does Business

Boston

••• Textile machinery, printing press and some special equipment manufacturers having their own foundries are operating them on a 5-day week basis, but not placing outside castings orders as frequently as heretofore. Machine tool foundries are generally operated on shortened schedules. Most jobbing foundries are doing comparatively little. In fact, many of the latter are quite hard hit for business. For the first time since the war they are actively soliciting business.

Foundries generally can get all the pig iron needed and cast scrap is going begging; everybody appears to have lost interest in it. Steel mill scrap prices here are also decidedly soft.

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MACHINE TOOLS

... News and Market Activities

Industry's Sales Pattern Remains Unchanged in Major Sectors

• • • Absence of any definite change for better or worse in the machine tool sales pattern was reported this week by trade sources in major sales sectors.

Business is spotty. To date February has been pretty quiet, although some segments of the trade allege that if some of the programs that are in the talk stage develop, the order books will look considerably better.

In Detroit the lull in machine tool buying continues as far as most suppliers are concerned, but there is a brighter side to the picture. Some orders have been placed during the past fortnight for the new General Motors technical center. There has also been an increase in activity in GM's transmission plant at Saginaw.

Meanwhile, the usual amount of speculation is heard concerning future plans of some of the auto producers. It has been pointed out, for example, that with the increase in production of high pressure engines for Oldsmobile to 60 per hr, it might be possible at some future time to supply rocket engines to other GM divisions on request, even though the new engines were not standard equipment.

Another source of speculation here is the possibility that Ford may have ambitions in the die-casting field. Although there are no reports that Ford has made any definite commitments, it is known that quotations have been requested that might lead to extensive production of diecastings by the Ford company.

There are also dark hints that Chrysler has some important engine plans in mind, but thus far the outlines are too dim to permit accurate evaluation.

In Cleveland, National Machine Tool Builders' Assn. is distribut-

Business Spotty, February Is Bleak; New Orders Needed to Brighten Outlook

• • •

ing an abbreviated machine tool primer titled "Machine Tools Today," which if broadly distributed in the right places, will probably prove to be a first class public relations move by the industry. The booklet tells what a machine tool is, describes the five basic operations, and supplies some pertinent facts about the industry, including a map showing location by states of NMTBA companies, which many members of the working press, who are certainly not the people the industry is trying to reach in this case, will be glad to have on tap.

The booklet is written simply, but is free from the sometimes churlish over-simplification that has marked the efforts of a few other industries to explain themselves. It is an excellent example of grass roots material that will find appreciation also at the policy level.

In Mount Gilead, Ohio, J. M. Dolan, vice-president in charge of sales, Hydraulic Press Mfg. Co., announced that a new central district sales office has been established in Mount Gilead, replacing the office in Cleveland. H. J. Miller will be in charge of the new sales office, with A. S. Linzell as sales engineer, the announcement stated.

Elsewhere . . . Army aeronautical experts are weighing a proposal by a manufacturer of contour measuring machines to make special precision contour measuring machine for propeller blades, which will reduce substantially

inspection time required. . . . In the early stages of the ECA machine tool program, it was thought that multiple spindle automatics would have the first call from foreign buyers, but recent indications are that gear making machines are getting the initial nod. . . . contract tool and die shops report business during January was quiet, some layoffs have resulted. A little rearmament business is coming through, but backlogs are down.

At the National Tool & Die Manufacturers Assn. convention the following paper was presented, written by a fictitious die maker, somewhat in the manner of Mrs. Eleanor Roosevelt's newspaper Column, "My Day."

MY DAY

7:00 a.m. No hurry! I got 2 min yet, and the ping pong ball is still bouncing.
7:10 a.m. Emerging from the dressing room, but almost forgot to stop at the peanut machine. Can't find any pennies—have to change 5 bucks.
7:15 a.m. Finally got change, but peanut machine is empty. Put in complaint to the Shop Committee.
7:20 a.m. String of apron busted. Have to hunt around for another one.
7:30 a.m. Just ready to go to town, but forgot to put lunch in icebox. See a Pepsi-Cola and take one when nobody is looking. Go in dressing room and finish bottle.
8:15 a.m. Milkman just driving in. Rush out to be the first in line. Go through his sandwiches, but can't find a "Dagwood"—decide to take Limburger.
9:00 a.m. Work strenuously now. Have milling machine, grinder and jig borer all tied up, but decided to make layout first.
9:30 a.m. Wait around in furnace room for piece to get blue. Cut down the flame. No use wasting gas, and anyway, it takes longer that way.
10:30 a.m. Just ready to start laying out, but the guys start hollering. They want the grinder and jig borer. Have to argue with them.
10:45 a.m. Take my pieces back from machines and am disgusted. The Limburger was not so hot either.
11:00 a.m. Have to go to washroom. Can't find the morning paper.
11:30 a.m. Remember I need matches and get them from the office. Ask the bookkeeper when my next raise is due and try to find out what the other guy gets. Claim my last check was wrong, and, anyway, I should be top man.
11:45 a.m. Could not get the information, and no raise either. Have to think this over, but no time now. Must get ready for lunch, etc. . . . etc.

"MARVEL" HAS the edge



MARVEL High-Speed-Edge Blades assure Faster, more Accurate cutting with proven Economy and complete Safety. Only the MARVEL is a composite blade with a high speed steel cutting edge electrically welded to an exceptionally tough, strong alloy steel body.

The High-Speed-Edge does the cutting while the alloy back, with hardened eyes, carries the load. Blade tensions up to 300% higher than those possible with ordinary blades are recommended. This greater tension is confined to the cutting or leading edge by the location of pin holes (exclusive MARVEL design feature) and cannot be overcome by work resistance. Heavier feeds and greater speeds are practical without "run out."

With greater accuracy, higher production and lower cost per cut, comes the extra dividend of Safety, for MARVEL High-Speed-Edge Hack Saw Blades are Positively Unbreakable—they will not shatter.

Ask your local MARVEL distributor (see classified phone book) to help you modernize your metal sawing with MARVEL High-Speed-Edge Blades. They cost no more than ordinary high speed steel blades.

1. High-Speed-Steel cutting edge.
2. Tough unbreakable alloy steel body with hardened eyes.
- 1&2. Integrally welded to make a fast-cutting, long lasting composite blade that is *positively unbreakable*.

ARMSTRONG-BLUM MFG. COMPANY

"THE HACK SAW PEOPLE"

5700 BLOOMINGDALE AVENUE

CHICAGO 39, ILLINOIS



Power Deal Permits Early Aluminum Delivery for Wire and Cable

New York

• • • Recently the Rural Electrification Administration found itself with about 25,000 miles of poles erected throughout the Midwest and South without the possibility of early delivery of wire and cable to put the lines into operation. All the aluminum producers had been canvassed repeatedly by REA but the overall shortage of primary aluminum placed deliveries in 1953. Some additional ingot capacity was available, but the underlying shortage was in power.

The solution was found in a deal worked out by REA and Reynolds Metals Co. by which power required to put an additional potline into production at Jones Mills, Ark., would be furnished so that the new ingot tonnage could be diverted to wire and cable production. This power is expected to become available by the end of the month at the latest.

The contract for the sale of the cable involves 600 million lb over a 10-year period. The cable is to be priced at prevailing market prices at the time of delivery. At current prices ranging from 25¢ to 28¢ per lb, the contract would involve an ultimate \$150 million. This development might be considered to be the most important to date in establishing active competition in the aluminum market.

The next few months are calculated to be the most critical in working out the project. Purchases are to be made through the Wisconsin Electric Cooperative, who will distribute cable to other power cooperatives. The arrangement requires that firm orders for

Expect Next Few Months to Be Most Critical in Working Out Project Plans

o o o

cable must be delivered from Mar. 15 through May 15 to the Wisconsin cooperative, together with advance payments for the whole contract estimated at \$6 million. So far, cooperatives have generally endorsed the project.

Last week, Permanente Products Co. announced that it was accepting inquiries from users of aluminum cable and other conductors for scheduled deliveries beginning in the fourth quarter of 1949. It was estimated that 15 million lb of conductor would be produced in the fourth quarter, with increasing tonnages thereafter.

It was said that plans have been completed to increase Permanente's ingot capacity in order to meet the demands of this program. These increased primary production facilities, it was said, would be ready to go into production later on this year. Conductor production was to be at the newly acquired Newark, Ohio, rod and bar mill. Machinery reported to have been ordered as long as a year ago was said to have been arriving and the necessary concrete footings have been installed. The plant is scheduled for operation in the third quarter.

There has been considerable surprise in the industry at the prospect of new primary ingot capacity at Permanente this year.

As recently as two weeks ago at the Electric Light and Power convention a Kaiser spokesman indicated that there was no prospect for early deliveries of wire and cable. Speculation in the industry revolves around the prospect for an easier aluminum market some time this year which would make ingot capacity available for wire and cable production. There has been no indication so far of any significant cancellation or deferment of orders, but consumers are generally following a policy of inventory reduction.

Since there are no idle pot lines at the Permanente plant, new capacity would have to be constructed at an estimated minimum time of six months. But the principal deterrent to expanded aluminum capacity has long been the nationwide power shortage which is particularly critical in the Northwest. Producers in that area have suffered heavy losses of the power made available to them and fear that further losses are yet to come. Only last week a spokesman for a West Coast utility company, less likely to take a pessimistic view than Government power officials, estimated that Northwest power would be inadequate until 1953.

A spokesman for Permanente Metals Co. told THE IRON AGE that the company is not yet ready to announce the details of the primary aluminum expansion program but that it hinges on the availability of secondary or peak power. Additional facilities to the extent of \$4 million are to be added to the Newark Rod and Bar mill.

An interesting sidelight is that the published base prices of Permanente aluminum cable steel reinforced, while competitive with those of other producers, are quoted f.o.b. shipping point Heath, Ohio. Aluminum ingots were recently placed on an f.o.b. producing point basis, but this is the first application of the mill pricing system to fabricated products by any aluminum producer.

Nonferrous Metals Prices

	Feb. 9	Feb. 10	Feb. 11	Feb. 12	Feb. 14	Feb. 15
Copper, electro, Conn.	23.50	23.50	23.50	23.50	23.50	23.50
Copper, Lake, Conn.	23.625	23.625	23.625	23.625	23.625	23.625
Tin, Straits, New York	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03
Zinc, East St. Louis	17.50	17.50	17.50	17.50	17.50	17.50
Lead, St. Louis	21.30	21.30	21.30	21.30	21.30	21.30

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	17.00
Aluminum pig	16.00
Antimony, American, Laredo, Tex.	38.50
Beryllium copper, 3.75-4.25% Be	
dollars per lb contained Be	\$24.50
Beryllium aluminum 5% Be, dollars per lb contained Be	\$52.00
Cadmium, del'd	\$2.00
Cobalt, 97-99% (per lb)	\$1.65 to \$1.72
Copper, electro, Conn. Valley	23.50
Copper, lake, Conn. Valley	23.625
Gold, U. S. Treas., dollars per oz.	\$35.00
Indium, 99.8%, dollars per troy oz.	\$2.25
Iridium, dollars per troy oz.	\$110 to \$115
Lead, St. Louis	21.30
Lead, New York	21.50
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask, f.o.b. New York	\$90 to \$92
Nickel, electro, f.o.b. New York	42.90
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per troy oz.	\$89 to \$93
Silver, New York, cents per oz.	70.75
Tin, Grade A, New York	\$1.03
Zinc, East St. Louis	17.50
Zinc, New York	18.193
Zirconium copper, 10-12 pct Zr, per lb contained Zr	\$12.00

Remelted Metals

Brass Ingot

(Published prices, cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	19.00*
No. 120	18.50*
No. 123	18.00*
80-10-10 ingot	
No. 305	27.25
No. 315	24.25
88-10-2 ingot	
No. 210	33.00
No. 215	31.00
No. 245	23.25*
Yellow ingot	
No. 405	16.50*
Manganese bronze	
No. 421	23.00

* F.o.b. Philadelphia.

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	27.00-28.00
0.60 copper, max.	26.50-27.50
Piston alloys (No. 122 type)	23.25-24.25
No. 12 aluminum (No. 2 grade)	22.50-24.00
108 alloy	23.75-24.75
195 alloy	24.25-25.25
13 alloy	26.50-27.50
AXS-679	24.00-25.00

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95 pct-95 1/2 pct	24.25-25.25
Grade 2—92 pct-95 pct	22.50-23.50
Grade 3—90 pct-92 pct	22.25-23.25
Grade 4—85 pct-90 pct	22.00-23.00

Electroplating Supplies

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	40 1/2
Electrodeposited	34 1/2
Rolled, oval, straight, delivered	37.34
Ball anodes	38 1/2
Brass, 80-20	
Cast, oval, 15 in. or longer	35 1/2
Zinc, oval, 99.99	
Ball anodes	20.50
Nickel 99 pct plus	
Cast	59.00
Rolled, depolarized	60.00
Cadmium	\$2.10
Silver 999 fine, rolled, 100 oz. lots, per troy oz, f.o.b. Bridgeport, Conn.	79

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	46.00
Copper sulfate, 99.5 crystals, bbls.	9.10
Nickel salts, single or double, 100 lb bags, frt. allowed	20.00
Nickel chloride, 300 lb bbl.	24.50
Silver cyanide, 100 oz. lots, per oz.	59
Sodium cyanide, 96 pct domestic 100 lb drums	16.00
Zinc sulfate, crystals, 22.5 pct, bags	
Zinc sulfate, 25 pct, granules, bbls, frt allowed	

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 28.8¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.8¢; 76S-O, 76S-OAL, 36.3¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 30.2¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 76S-O, 76S-OAL, 38¢; 0.032 in., 2S, 3S, 29.5¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 76S-O, 76S-OAL, 47.6¢.

Plate: 1/4 in. and heavier: 2S, 3S, F, 23.8¢; 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 76S-F, 76S-FAL, 33.9¢.

Extruded Solid Shapes: Shape factors 1 to 4, 35.1¢ to 66¢; 11 to 13, 36.1¢ to 78¢; 23 to 25, 38.2¢ to \$1.07; 35 to 37, 45.7¢ to \$1.65; 47 to 49, 67.5¢ to \$2.41.

Rod, Rolled: 1.064 to 4.5 in., 2S-F, 3S-F, 34¢ to 30.5¢; Cold-finished, 0.375 to 3.5 in., 2S, 3S, 36.5¢ to 32¢.

Screw Machine Stock: Drawn, 1/8 to 1 1/32 in., 11S-T8, R317-T4, 49¢ to 38¢; cold-finished, 1/8 to 1 1/2 in., 11S-T8, 37.5¢ to 35.5¢; 3/8 to 2 in., R317-T4, 37.5¢ to 34.5¢; rolled, 1 9/16 to 3 in., 11S-T8, 35.5¢ to 32.5¢; 2 1/2 to 3 3/8 in., R317-T4, 33.5¢ to 32.5¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.: 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 56S, 47¢ to 35.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 34¢; 76S-T6, 76¢ to 55¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed Base quantity 30,000 lb)

Sheet and Plate: Ma, FSA, 1/4 in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-1.01; 22, \$1.22-\$1.31; 24, \$1.62-\$1.75. Specification grade higher.

Extruded Round Rod: M, diam. in., 1/4 to 0.311, 58¢; 1/2 to 3/4, 46¢; 1 1/4 to 1.749, 43¢; 2 1/2 to 5, 41¢. Other alloys higher.

Extruded Square, Hex. Bar: M, size across flats, in., 1/4 to 0.311, 61¢; 1/2 to 0.749, 48¢; 1 1/4 to 1.749, 44¢; 2 1/2 to 4, 42¢. Other alloys higher.

Extruded Solid Shapes, Rectangles: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb. per ft, per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher.

Extruded Round Tubing: M, wall thickness, outside diam. in., 0.049 to 0.057, 1/4 to 5/16, \$1.14; 5/16 to 3/8, \$1.02; 1/2 to 5/8, 76¢; 1 to 2 in., 65¢; 0.065 to 0.082, 5¢ to 7/16, 85¢; 3/8 to 1/2, 62¢; 1 to 2 in., 57¢; 0.165 to 0.219, 3/8 to 1/2, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and shapes		
Hot-rolled	56	45
Cold-drawn	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks		40

Copper, Brass, Bronze

(Cents per pound, freight prepaid on 200 lb)

	Extruded Shapes	Rods	Sheets
Copper	36.78	37.18	37.18
Copper, hot-rolled	33.03		
Copper, drawn	34.28		
Low brass	33.57*	35.35	35.66
Yellow brass	37.60*	34.28	34.59
Red brass	38.92*	35.70	36.01
Naval brass	34.90	33.65	39.59
Leaded brass		29.24	
Commercial			
bronze	39.54*	36.57	36.88
Manganese bronze	38.49	36.99	43.09
Phosphor bronze, 5 pct	57.80*	56.30	56.05
Muntz metal	34.47	33.22	37.66
Everdur, Herculo, Olympic, etc.	40.49	40.76	41.82
Nickel silver, 10 pct		47.17	44.77
Architectural bronze	33.42		

* Seamless tubing.

Scrap Metals

Brass Mill Scrap

(Cents per pound; add 1/2¢ per lb for shipments of 20,000 lb or more)

	Heavy	Turn-ings
Copper	21 1/4	20 3/4
Yellow brass	18 1/2	18 1/4
Red brass	20	19 1/4
Commercial bronze	20 1/2	19 3/4
Manganese bronze	18 1/2	17 3/4
Leaded brass rod ends	18 1/2	

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.75-20.00
No. 2 copper wire	18.75-19.00
Light copper	17.75-18.00
Refinery brass	17.50-17.75

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper, wire	19.75
No. 2 copper, wire	18.75
Light copper	17.75
No. 1 composition	14.50-15.00
No. 1 comp. turnings	14.25-14.75
Rolled brass	12.75-13.25
Brass pipe	13.25-13.75
Radiators	13.75-14.00
Heavy yellow brass	12.00-12.25

Aluminum

Mixed old cast	14.25-14.50
Mixed old clips	14.25-14.75
Mixed turnings, dry	13.50-13.75
Pots and pans	14.50-15.75
Low copper	17.75-18.25

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	17 1/4—18 1/4
No. 2 heavy copper and wire	16 1/4—17 1/4
Light copper	15 1/4—16 1/4
Auto radiators (unsweated)	10 1/2—11
No. 1 composition	12 1/2—13
No. 1 composition turnings	12 1/2—12 3/4
Clean red car boxes	10 1/2—11
Cocks and faucets	10 1/2—11
Mixed heavy yellow brass	7 1/2—8 1/4
Old rolled brass	10 1/2—11
Brass pipe	11 1/2—12
New soft brass clippings	15—15 1/2
Brass rod ends	11 1/2—12
No. 1 brass rod turnings	8 1/2—9

Aluminum

Alum. pistons and struts	6 1/2—7
Aluminum crankcases	10—10 1/2
2S aluminum clippings	14—14 1/2
Old sheet and utensils	10—10 1/2
Borings and turnings	5—5 1/2
Misc. cast aluminum	10—10 1/2
Dural clips (24S)	10—10 1/2

Zinc

New zinc clippings	10 1/2—11
Old zinc	9—9 1/2
Zinc routings	5 1/4—5 1/2
Old die cast scrap	5 1/2—6

Nickel and Monel

Pure nickel clippings	22—23
Clean nickel turnings	17—18
Nickel anodes	22—23
Nickel rod ends	21—22
New Monel clippings	16 1/2—17 1/2
Clean Monel turnings	11—12
Old sheet Monel	13—14
Old Monel castings	11—12
Inconel clippings	13—14
Nickel silver clippings, mixed	8—8 1/2
Nickel silver turnings, mixed	7—7 1/2

Lead

Soft scrap lead	14 1/2—15
Battery plates (dry)	7—7 1/4

Magnesium Alloys

Segregated solids	8—9
Castings	4 1/2—5 1/2

Miscellaneous

Block tin	82—84
No. 1 pewter	65—67
No. 1 auto babbitt	51—53
Mixed common babbitt	16—16 1/2
Solder joints	20—21
Siphon tops	50—52
Small foundry type	18—18 1/2
Monotype	17—17 1/2
Lino. and stereotype	16—16 1/2
Electrotype	14—14 1/2
New type shell cuttings	15—15 1/2
Hand picked type shells	6—6 1/2
Lino. and stereo. dross	8 1/2—9
Electro. dross	6—6 1/2

Foundry cuts annealing and firing time practically in two!

How Johns-Manville Insulating Fire Brick enables 6 new furnaces to do work formerly requiring 12

This is the story of a foundry that called on Johns-Manville Insulation Engineers about the plans for their new annealing furnaces.

The company had been operating 12 furnaces constructed with heavy fire brick. One of these furnaces was rebuilt, for test purposes, with insulating materials recommended for the job by Johns-Manville Insulation Engineers. After the furnace was completed, exhaustive operating tests were made and results were compared with the old furnaces.

Test Results

The old furnaces in this foundry performed with an average annealing cycle of 120 hours. The new furnace made it possible to cut the annealing cycle to as low as 72 hours.

The firing time was 80-100 hours depending upon the quality of fuel available. Average firing time in the new furnace was cut to 40 hours.

These results were so striking that the management decided to build 5 additional furnaces of similar construction.

The 6 new furnaces, as engineered by Johns-Manville, are expected to fill all production needs of the plant—replacing entirely the 12 old-style furnaces—resulting in doubled operating efficiency.

Materials Used

The furnace walls were built with thirteen and a half inches of JM-23 Insulating Fire Brick. In every fifth course, vertically, a header row of brick was used with a stretcher course of brick to tie the wall into a solid unit.

To further decrease the heat transfer through the walls, a combination of 2" thickness of J-M Superex Blocks and 1" thickness of 85% Magnesia Blocks was used between the insulating brick walls and the outer steel casing.

The arch was constructed with a 9" thickness of JM-26 Insulating Fire Brick. Over this, 5 inches of Sil-O-Cel Natural Brick was installed in two 2½" layers. That part of the arch subject to abrasion from the powdered fuel is constructed of fire brick. In order to keep the heat transfer approximately uniform over the entire arch area, that portion constructed of fire brick was backed with a 2½" thickness of J-M Superex Blocks. And, over this, five inches of Sil-O-Cel Natural Brick was applied.



Cutting J-M Insulating Fire Brick on the job.

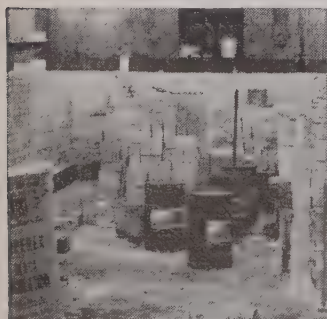


J-M 1626 cement was used as bonding agent.

The furnace bottom was insulated first with a 4" thickness of Sil-O-Cel C-3 concrete. Over this base, ten inches of Sil-O-Cel C-22 brick were laid. A 4" course of paving brick supplies the wearing surface for the high load-bearing insulating material used for the furnace bottom.

Engineering Service

The same service performed by J-M Insulation Engineers in selecting the right combination of insulating materials to increase efficiency for this plant can be made available to you. Write Johns-Manville, Box 290, New York 16, New York.



Partially completed furnace with J-M materials ready for installation.



Market Weak; Mills Expected Back In Soon

New York

••• The market remains weak. Cast grades slumped further. Mills continue to stay out of the market. Everything looks gloomy in the scrap picture. But the weather remains good.

Heavy melting scrap held its own in all market areas except Buffalo where it dropped \$2 a ton. Cast grades there, too, as everywhere else were weak and emphasized the fact with corresponding price declines.

Most sources expect the mills to come back into the market by Mar. 1. Operating rates have stayed at about 100 pct of capacity for 5 straight weeks and inventories are dwindling. Making steel at a rate of 97 million tons annually consumes scrap in larger proportions than ever before in the history of the nation.

If the operating rate is maintained at the current high level for a big part of the year, the present scrap situation will undoubtedly be a temporary one. Scrap prices have been driven down. Some people expect them to fall a little further before the bottom is hit. When buying starts again, these sources point out, prices will probably level off a rebound somewhat.

The statement that the weather remains good might appear trite. But it has enabled scrap collection to continue through a period of the year when it normally falls off to nothing. Therefore, when the mills come back in, the supply situation will not be as acute as it was a year ago. In this light, scrap prices should not see the high level they enjoyed through 1948.

PITTSBURGH — In a final drive to clean up old orders, brokers' buying prices to dealers had climbed by \$1 or more to \$40 at the beginning of the week. Representative tonnages of No. 2 steel were bought for \$37 a ton on Feb. 11, following up the offers made earlier that week. Most of the list was off this week. Railroad specialties took the biggest drop. They were off \$3 as foundries looking at inventories and business prospects, wouldn't go over \$50 a ton for them. The

Baltimore & Ohio awarded its No. 1 steel at \$42 while the Pennsylvania awarded it to at least two mills at \$44, with some confusion about the latter price at one mill.

CHICAGO—For weeks the scrap trade has been saying the market was extremely weak. Railroad specialty lists sold last week in Chicago prove that these men knew what they were talking about. Some of these items recorded drastic declines, particularly in cast grades. There is considerable confusion concerning the price of cast iron but one thing for sure—it's not worth as much as pig iron today. Turning and boring prices have leveled off at a flat \$25 delivered regardless of grade. Despite the most bearish market conditions seen in this area in years many observers declare the market is not as weak as present prices would indicate. They say a major purchase by any mill would firm things in a hurry.

PHILADELPHIA—Mills were still out of the market last week and, although eating into reserves, it is learned that mills are still comfortable. Dealers are growing restive in the absence of any kind of a market. Rejections are still being reported. Turnings were bought from the Navy Yard for \$29. Aside from the absence of a market for heavy melting grades, there are no takers for shovelings, low phos for openhearth use, and most grades of cast. It is understood that one pipe mill placed a few small orders for cast at \$40. Yard intake is low and dealers generally report their inventories to be low.

CLEVELAND — Broker offerings of heavy melting grades at lower prices were more in sympathy with developments in the price pattern in other districts, notably Pittsburgh, than anything else. The trade now feels that openhearth here will, before the end of the present price decline, reach \$35. But this is wishful thinking. On the other hand, it is believed that all the "water" is out of cast prices. Mills here are out of the market until Mar. 1 and perhaps Apr. 1.

DETROIT—The scrap trend in Detroit this week is mixed. While cast grades continue to exhibit pronounced weakness in the face of low foundry operations and more plentiful pig iron supplies and local mills are reported to be tightening their inspection, a considerable amount of competition has developed over No. 1 bundles suitable for electric furnace melting. Reports are that top grade material may bring premiums of \$5 per ton or more. The possibility of developing a price differential here between No. 1 and No. 2 openhearth grades is a topic of conversation but the volume of scrap reflecting this trend is still not significant, according to most local sources.

CINCINNATI—A buyer's market with little or no demand and a minimum of trading prevails here. Tonnages moving

to mills take care of current consumption and nothing more. What buying is being done is practically on a week to week basis. Foundries are not buying and are apparently willing to chance possible cast price increases later on than build up scrap inventories at the present time. The trade hints of a further drop in prices around Mar. 1, unless mills come in for substantial tonnages.

NEW YORK—Lack of sales here leaves it hard to determine actually how weak the market is. Dealers and brokers have no idea of what the score is as long as mills stay out. Reports of a mill's willingness to buy perks all ears. But when they do buy, they buy very little. These purchases, however, do act as a barometer of conditions. They are feelers. They give an indication of where the market is going. When the mills finally do come back into the market, it won't be at prices above those quoted. Dealers hope it won't be far below. One substantial purchase by a mill would do a lot to clarify the situation.

BOSTON—With a few sales and little demand, the scrap market continues inactive here. Though price drops were not as substantial as they have been, prices still tended toward the weak side. There were absolutely no sales in No. 1 and No. 2 machinery cast and stove plate. Although prices of these grades are quoted slightly lower than last week, any price quoted would be strictly nominal.

BIRMINGHAM—The market undertone here is weaker, although for the first time in several weeks, there has been no substantial price decline on major items. Consumers are doing very little buying and material moving is on token orders. Particularly light is the demand for foundry steel and cast iron.

BUFFALO—Another week without buying by leading consumers put the market for openhearth grades down \$2 to \$3. Other grades slumped in sympathy. Only worthwhile local business reported was a purchase of borings and turnings by a blast furnace operator at \$32 delivered. The drop in No. 2 heavy melting to \$34 to \$35, however, carried light stuff down proportionately. Cast scrap was demoralized, losing \$6 to \$7 and rail specialties were lowered another \$2. Brokers were reported sharpshooting around for expiring orders to get over the market prices for a few odd cars on quick sales.

ST. LOUIS—Steel mills in the St. Louis industrial district are out of the market, and it is expected they will do no more buying until the end of the month. Foundry buying also is shut off because of a slowing down of their business. With no buying the market is nominally unchanged, although its weakness continues. Shipments now being made against old orders.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$38.50 to \$39.00
RR. hvy. melting	42.00 to 44.00
No. 2 hvy. melting	36.50 to 37.00
RR. scrap rails	52.00 to 53.00
Rails 2 ft and under	55.50 to 56.50
No. 1 comp'd bundles	38.50 to 39.00
Hand bldd. new shts.	38.50 to 39.00
Hvy. steel forge turn.	37.50 to 38.00
Mach. shop turn.	31.50 to 32.00
Shoveling turn.	33.50 to 34.00
Mixed bor. and turn.	31.50 to 32.00
Cast iron borings	32.00 to 32.50
No. 1 mach. cast	57.00 to 58.00
Mixed yard cast	48.50 to 49.50
Hvy. breakable cast	45.00 to 46.00
Malleable	58.00 to 59.00
RR. knuck. and cup.	49.00 to 50.00
RR. coil springs	49.00 to 50.00
RR. leaf springs	49.00 to 50.00
Roller steel wheels	49.00 to 50.00
Low phos.	44.50 to 45.00

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$34.00 to \$35.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 bundles	34.00 to 35.00
No. 2 dealers' bundles	32.00 to 33.00
Bundled mach. shop turn.	26.00 to 27.00
Galv. bundles	27.00 to 28.00
Mach. shop turn.	24.00 to 25.00
Short shov. turn.	24.00 to 25.00
Cast iron borings	24.00 to 25.00
Mix. borings and turn.	24.00 to 25.00
Low phos. hvy. forge	42.00 to 43.00
Low phos. plates	38.00 to 41.00
No. 1 RR. hvy. melt.	38.00 to 39.00
Rerolling rails	49.00 to 50.00
Miscellaneous rails	40.00 to 41.00
Angles & splice bars	40.00 to 41.00
Locomotive tires, cut.	42.00 to 43.00
Cut bolster & side frames	39.00 to 40.00
Standard stl. car axles	60.00 to 62.00
No. 3 steel wheels	41.00 to 42.00
Couplers and knuckles	40.00 to 41.00
Rails, 2 ft and under	46.00 to 47.00
Malleable	41.00 to 48.00
No. 1 mach. cast	40.00 to 44.00
No. 1 agricul. cast	38.00 to 42.00
Heavy breakable cast	38.00 to 41.00
RR. grate bars	32.00 to 33.00
Cast iron brake shoes	32.00 to 35.50
Cast iron car wheels	38.00 to 40.00

CINCINNATI

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	\$33.50 to \$34.00
No. 2 hvy. melting	33.50 to 34.00
No. 1 bundles	33.50 to 34.00
No. 2 bundles	33.50 to 34.00
Mach. shop turn.	28.50 to 29.00
Shoveling turn.	30.50 to 31.00
Cast iron borings	29.50 to 30.00
Mixed bor. & turn.	28.50 to 29.00
Low phos. 18 in. under	41.00 to 43.00
No. 1 cupola cast.	48.00 to 50.00
Hvy. breakable cast.	40.00 to 42.00
Rails 18 in. and under	52.00 to 54.00
Rails random length	44.00 to 46.00
Drop broken	53.00 to 55.00

BOSTON

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	\$31.00 to \$32.00
No. 2 hvy. melting	29.50 to 30.00
Nos. 1 and 2 bundles	29.50 to 30.00
Bushellings	29.50 to 30.00
Shoveling turn.	27.00
Machine shop turn.	\$25.00 to 26.00
Mixed bor. and turn.	25.00 to 26.00
Cl'n cast chem. bor.	29.00 to 30.00
No. 1 machinery cast.	39.50 to 40.50
No. 2 machinery cast.	37.00 to 38.00
Heavy breakable cast.	34.00 to 35.00
Stove plate	36.00 to 37.00

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting	\$32.00 to \$33.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 bundles	32.00 to 33.00
New bushelling	32.00 to 33.00
Flashings	32.00 to 33.00
Mach. shop turn.	21.00 to 22.00
Machinery cast	40.00 to 48.00
Mixed yard cast	41.00 to 43.00
Shoveling turn.	22.00 to 23.00
Cast iron borings	22.00 to 23.00
Mixed bor. & turn.	21.00 to 22.00
Low phos. plate	37.00 to 38.00
Heavy breakable cast	36.00 to 39.00
Stove plate	42.00 to 44.00
Automotive Cast	46.00 to 48.00

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$39.00 to \$40.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 bundles	39.00 to 40.00
No. 2 bundles	33.00 to 33.50
Mach. shop turn.	31.00 to 31.50
Shoveling turn.	32.00 to 32.50
Mixed bor. and turn.	31.00 to 31.50
Clean cast chemical bor.	32.00 to 34.00
No. 1 machinery cast.	45.00 to 47.00
No. 1 mixed yard cast	43.00 to 44.00
Hvy. breakable cast.	44.00 to 45.00
Hvy. axle forge turn.	39.00 to 40.00
Low phos. acid openhearth	41.00 to 42.00
Low, phos., electric furnace	42.00 to 43.00
Low phos. bundles	39.00 to 40.00
RR. steel wheels	45.00 to 46.00
RR. coil springs	45.00 to 46.00
RR. malleable	51.00 to 52.00
Cast iron carwheels	52.00 to 53.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$37.00 to \$38.00
No. 2 hvy. melting	33.00 to 34.00
Bundled sheets	33.00 to 34.00
Mach. shop turn.	25.00 to 26.00
Shoveling turnings	27.00 to 28.00
Locomotive tires, uncut.	40.00 to 41.00
Mis. std. sec. rails	42.00 to 43.00
Steel angle bars	46.00 to 47.00
Rails 3 ft and under	48.00 to 50.00
RR. steel springs	44.00 to 45.00
Steel car axles	60.00 to 62.00
Brake shoes	43.00 to 45.00
Malleable	55.00 to 57.00
Cast iron car wheels	50.00 to 52.00
No. 1 machinery cast.	48.00 to 50.00
Hvy. breakable cast.	45.00 to 47.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$32.50
No. 2 hvy. melting	32.50
No. 2 bundles	31.00
No. 1 bushelling	32.50
Long turnings	24.00
Shoveling turnings	26.00
Cast iron borings	26.00
Bar crops and plate	\$37.00 to 37.50
Structural and plate	37.00 to 37.50
No. 1 cupola cast.	42.00 to 43.00
Stove plate	40.00 to 41.00
No. 1 RR. hvy. melt.	36.00
Steel axles	54.00 to 55.00
Scrap rails	40.00 to 41.00
Rerolling rails	50.00 to 52.00
Angles & splice bars	40.00 to 42.00
Rails 3 ft & under	40.00 to 42.00
Cast iron carwheels	48.00 to 50.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$38.50 to \$39.00
No. 2 hvy. melting	37.50 to 38.00
No. 2 bundles	37.50 to 38.00
Mach. shop turn.	31.00 to 32.00
Short shov. turn.	32.00 to 33.00
Cast iron borings	31.00 to 32.00
Low phos.	44.00 to 46.50

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	\$31.00 to \$32.00
No. 2 hvy. melting	29.00 to 30.00
No. 2 bundles	29.00 to 30.00
Mach. shop turn.	22.00 to 23.00
Mixed bor. & turn.	22.00 to 23.00
Shoveling turnings	23.50 to 24.50
Machinery cast	39.00 to 40.00
Mixed yard cast	35.00 to 36.00
Heavy breakable cast	33.00 to 34.00
Charging box cast	33.00 to 34.00
Unstrp. motor blks.	32.00 to 33.00
Cl'n cast chem. bor.	30.00 to 31.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$39.00 to 41.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 bundles	34.00 to 35.00
No. 2 bundles	34.00 to 35.00
No. 1 bushelling	34.00 to 35.00
Mach. shop turn.	29.00 to 30.00
Shoveling turn.	31.00 to 32.00
Cast iron borings	29.00 to 30.00
Mixed bor. and turn.	29.00 to 30.00
Clean auto. cast	47.00 to 49.00
Mixed yard cast	38.00 to 40.00
Stove plate	38.00 to 40.00
RR. malleable	60.00 to 65.00
Small indus. malleable	37.00 to 39.00
Low phos. plate	41.00 to 42.00
Scrap rails	48.00
Rails 3 ft & under	54.00 to 55.00
RR. steel wheels	47.00 to 48.00
RR. coil & leaf spgs.	47.00 to 48.00
RR. knuckles & coup.	47.00 to 48.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$38.00 to \$38.50
No. 2 hvy. melting	37.00 to 37.50
No. 1 bundles	37.00 to 37.50
No. 1 bushelling	37.00 to 37.50
Drop forge flashings	37.00 to 37.50
Mach. shop turn.	27.50 to 28.00
Shoveling turn.	29.50 to 30.00
Steel axle turn.	37.00 to 37.50
Cast iron borings	29.50 to 30.00
Mixed bor. & turn.	29.50 to 30.00
Low phos. 2 ft and under	42.00 to 43.00
No. 1 machinery cast.	50.00 to 52.00
Malleable	53.00 to 55.00
RR. cast.	50.00 to 52.00
Railroad grate bars	48.00 to 50.00
Stove plate	49.00 to 50.00
RR. hvy. melting	41.00 to 41.50
Rails 3 ft and under	55.00 to 56.00
Rails 18 in. and under	56.50 to 57.50

SAN FRANCISCO

Per gross ton, f.o.b. shipping point:

No. 1 hvy. melting	\$25.00
No. 2 hvy. melting	25.00
No. 2 bales	23.00
No. 3 bales	20.00
Mach. shop turn.	15.00
Elec. fur. 1 ft under	\$37.50 to 40.00
No. 1 cupola cast	38.00 to 40.00
RR. hvy. melting	26.00
Rails	26.50

LOS ANGELES

Per gross ton, f.o.b. shipping point:

No. 1 hvy. melting	\$25.00
No. 2 hvy. melting	25.00
No. 1 bales	25.00
No. 2 bales	23.00
No. 3 bales	20.00
Mach. shop turn.	15.00
Elec. fur. 1 ft. under	\$32.00 to 38.00
No. 1 cupola cast.	38.00 to 45.00
RR. hvy. melting	26.00

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.	\$27.50
Elec. fur. 1 ft and under	\$35.00 to 38.50
No. 1 cupola cast	38.00 to 40.00
RR. hvy. melting	23.50

HAMILTON, ONT.

Per gross ton delivered to consumer:

Cast grades f.o.b. shipping point:	
Heavy melting	\$23.00*
No. 1 bundles	23.00*
No. 2 bundles	22.50*
Mechanical bundles	21.00*
Mixed steel scrap	19.00*
Mixed borings and turnings	17.00*
Rails, remelting	23.00*
Rails, rerolling	26.00*
Bushellings	17.50*
Bushellings, new fact, prop'd	21.00*
Bushellings, new fact, unprop'd	18.00*
Short steel turnings	17.00*
No. 1 cast.	\$48.00 to 50.00*
No. 2 cast.	44.00 to 45.00*

*Ceiling Price.

For the Purchase or Sale of Iron and Steel Scrap...

CONSULT OUR NEAREST OFFICE



The energy and integrity of our organization is ready to serve your best interests ...
Since 1889, Luria Brothers & Company, Inc. have made fair dealings their constant aim.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices . .

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel:	Feb. 15, 1949	Feb. 8, 1949	Jan. 18, 1949	Feb. 17, 1948
(cents per pound)				
Hot-rolled sheets	3.26	3.26	3.26	2.80
Cold-rolled sheets	4.00	4.00	4.00	3.55
Galvanized sheets (10 ga)	4.40	4.40	4.40	3.95
Hot-rolled strip	3.265	3.265	3.265	2.80
Cold-rolled strip	4.063	4.063	4.063	3.55
Plates	3.42	3.42	3.42	2.95
Plates wrought iron	7.85	7.85	7.85	7.25
Stains C-R strip (No. 302)	33.25	33.25	33.25	30.50

Tin and Terneplate:

(dollars per base box)				
Tinplate (1.50 lb) cokes	\$7.75	\$7.75	\$7.75	\$6.80
Tinplate, electro (0.50 lb)	6.70	6.70	6.70	6.00
Special coated mfg. ternes	6.65	6.65	6.65	5.90

Bars and Shapes:

(cents per pound)				
Merchant bars	3.37	3.37	3.37	2.90
Cold-finished bars	3.995	3.995	3.995	3.55
Alloy bars	3.75	3.75	3.75	3.30
Structural shapes	3.25	3.25	3.25	2.80
Stainless bars (No. 302)	28.50	28.50	28.50	26.00
Wrought iron bars	9.50	9.50	9.50	8.65

Wire:

(cents per pound)				
Bright wire	4.256	4.256	4.256	3.55

Rails:

(dollars per 100 lb)				
Heavy rails	\$3.20	\$3.20	\$3.20	\$2.75
Light rails	3.55	3.55	3.55	3.10

Semifinished Steel:

(dollars per net ton)				
Rerolling billets	\$52.00	\$52.00	\$52.00	\$45.00†
Slabs, rerolling	52.00	52.00	52.00	45.00†
Forging billets	61.00	61.00	61.00	54.00†
Alloy blooms, billets, slabs	63.00	63.00	63.00	66.00†

Wire rod and Skelp:

(cents per pound)				
Wire rods	3.619	3.619	3.619	2.80
Skelp	3.25	3.25	3.25	2.90

† Gross ton

Pig Iron:

	Feb. 15, 1949	Feb. 8, 1949	Jan. 18, 1949	Feb. 17, 1948
(per gross ton)				
No. 2, foundry, Phila.	\$51.56	\$51.56	\$51.56	\$44.61
No. 2, Valley furnace	46.50	46.50	46.50	39.50
No. 2, Southern Cin'ti*	49.46	49.46	49.46	43.28
No. 2, Birmingham	43.38	43.38	43.38	37.38
No. 2, foundry, Chicago†	46.00	46.00	46.00	39.00
Basic del'd Philadelphia*	50.76	50.76	50.76	44.11
Basic, Valley furnace	46.00	46.00	46.00	39.00
Malleable, Chicago†	46.50	46.50	46.50	39.50
Malleable, Valley	46.50	46.50	46.50	39.50
Charcoal, Chicago	73.78	73.78	73.78	62.46
Ferromanganese‡	161.40	161.40	161.71	145.00

† The switching charge for delivery to foundries in the Chicago district is \$1 per ton.

‡ Average of U. S. prices quoted on Ferroalloy page.

* Does not include interim increase on total freight charges, effective Jan. 11, 1949.

Scrap

(per gross ton)				
Heavy melt'g steel, P'gh.	\$38.75	\$38.75	\$40.75	\$40.50
Heavy melt'g steel, Phila.	39.50	39.50	42.50	41.00
Heavy melt'g steel, Ch'go	34.50	34.50	39.50	38.75
No. 1, hy. comp. sh't, Det.	32.50	32.50	38.00	35.50
Low phos. Young'n.	45.25	45.25	47.00	45.25
No. 1, cast, Pittsburgh	57.50	58.50	64.00	59.50
No. 1, cast, Philadelphia	46.00	46.00	57.00	65.50
No. 1 cast, Chicago	42.00	49.00	53.50	64.50

Coke, Connellsville:

(per net ton at oven)				
Furnace coke, prompt	\$15.25	\$15.25	\$17.00	\$12.50
Foundry coke, prompt	16.75	16.75	17.00	14.00

Nonferrous Metals:

(cents per pound to large buyers)				
Copper, electro, Conn.	23.50	23.50	23.50	21.50
Copper, Lake Conn.	23.625	23.625	23.625	21.625
Tin, Grade A, New York	\$1.03	\$1.03	\$1.03	94.00
Zinc, East St. Louis	17.50	17.50	17.50	12.00
Lead, St. Louis	21.30	21.30	21.30	14.80
Aluminum, virgin	17.00	17.00	17.00	15.00
Nickel, electrolytic	42.90	42.90	42.90	36.56
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	38.50	38.50	38.50	33.00

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

Composite Prices . .

FINISHED STEEL (Base Price)

Feb. 15, 1949	3.75628¢	per lb.
One week ago	3.75628¢	per lb.
One month ago	3.75628¢	per lb.
One year ago	3.24816¢	per lb.

PIG IRON

....\$46.74	per gross ton....
....\$46.74	per gross ton....
....\$46.78	per gross ton....
....\$40.37	per gross ton....

SCRAP STEEL

....\$37.58	per gross ton....
....\$37.58	per gross ton....
....\$40.92	per gross ton....
....\$40.08	per gross ton....

	HIGH	LOW
1949....	3.75628¢ Jan. 1	3.75628¢ Jan. 1
1948....	3.75700¢ July 27	3.22566¢ Jan. 1
1947....	3.19541¢ Oct. 7	2.87118¢ Jan. 7
1946....	2.83599¢ Dec. 31	2.54490¢ Jan. 1
1945....	2.44104¢ Oct. 2	2.54490¢ Jan. 2
1944....	2.30837¢ Sept. 5	2.21189¢ Oct. 5
1943....	2.29176¢	2.29176¢
1942....	2.28249¢	2.28249¢
1941....	2.43078¢	2.43078¢
1940....	2.30467¢ Jan. 2	2.24107¢ Apr. 16
1939....	2.35367¢ Jan. 3	2.26589¢ May 16
1938....	2.58414¢ Jan. 4	2.27207¢ Oct. 18
1937....	2.58414¢ Mar. 9	2.32263¢ Jan. 4
1936....	2.32263¢ Dec. 28	2.05206¢ Mar. 10
1935....	2.07642¢ Oct. 1	2.06492¢ Jan. 8
1934....	2.15367¢ Apr. 24	1.95757¢ Jan. 2
1933....	1.95578¢ Oct. 3	1.75839¢ May 2
1932....	1.89196¢ July 5	1.83901¢ Mar. 1
1931....	1.99626¢ Jan. 13	1.86586¢ Dec. 29
1929....	2.31773¢ May 28	2.26498¢ Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

	HIGH	LOW
\$46.82 Jan. 4		\$46.74 Jan. 25
46.91 Oct. 12		39.58 Jan. 6
37.98 Dec. 30		30.14 Jan. 7
30.14 Dec. 10		25.37 Jan. 1
25.37 Oct. 23		23.61 Jan. 2
\$23.61		\$23.61
23.61		23.61
23.61		23.61
\$23.61 Mar. 20		\$23.45 Jan. 2
23.45 Dec. 23		22.61 Jan. 2
22.61 Sept. 19		20.61 Sept. 12
23.25 June 21		19.61 July 6
23.25 Mar. 9		20.25 Feb. 16
19.74 Nov. 24		18.73 Aug. 11
18.84 Nov. 5		17.83 May 14
17.90 May 1		16.90 Jan. 27
16.90 Dec. 5		13.56 Jan. 3
14.81 Jan. 5		13.56 Dec. 6
15.90 Jan. 6		14.79 Dec. 15
18.71 May 14		18.21 Dec. 17

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	HIGH	LOW
\$43.00 Jan. 1		\$37.58 Feb. 8
43.16 July 27		39.75 Mar. 9
42.58 Oct. 28		29.50 May 20
31.17 Dec. 24		19.17 Jan. 1
19.17 Jan. 2		18.92 May 22
19.17 Jan. 11		15.76 Oct. 24
\$19.17		\$19.17
19.17		19.17
\$22.00 Jan. 7		\$19.17 Apr. 10
21.83 Dec. 30		16.04 Apr. 9
22.50 Oct. 3		14.08 May 16
15.00 Nov. 22		11.00 June 7
21.92 Mar. 30		12.67 June 9
17.75 Dec. 21		12.67 June 8
13.42 Dec. 10		10.33 Apr. 29
13.00 Mar. 13		9.50 Sept. 25
12.25 Aug. 8		6.75 Jan. 3
8.50 Jan. 12		6.43 July 5
11.33 Jan. 6		8.50 Dec. 29
17.58 Jan. 29		14.08 Dec. 8

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. producing points in cents per pound unless otherwise indicated. Extras apply. (1) Commercial quality sheet grade; prices, 0.25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Cokes, 1.25 lb, deduct 25¢ per base box. (6) 18 gage and heavier. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb and over. (9) Carload lot in manufacturing trade. (10) Hollowware enameling, gages 29 to 31 only. (11) Produced to dimensional tolerances in AISI Manual Sec. 6. (12) Slab prices subject to negotiation in most cases. (13) San Francisco only. (14) Los Angeles only. (15) San Francisco and Los Angeles only. (16) Seattle only. (17) Seattle and Los Angeles only.

Base prices at producing points apply to the sizes and grades produced in these areas

PRODUCTS	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio			Detroit	Johns- town	Seattle, S. Frisco, Los Angeles	Fontana
INGOTS Carbon forging	\$50.00															
Alloy	\$51.00						(per net ton)									
BILLETS, BLOOMS, SLABS Carbon, rerolling ^{1,2}	\$52.00				\$52.00	\$52.00	(per net ton)							\$52.00		
Carbon forging billets	\$61.00	\$61.00	\$61.00	\$61.00	\$61.00	\$61.00	(per net ton)							\$61.00		
Alloy	\$63.00	\$63.00				\$63.00	(Bethlehem, Canton, Massillon = \$63.00) (per net ton)									
PIPE SKELP	3.25						3.25					Warren = 3.25				
WIRE RODS	3.40 to 4.15	3.40 to 3.90		3.40	3.40		3.85	3.50				Worcester 3.70		3.40	4.05 ^{1,3} 4.10 ^{1,4}	
SHEETS Hot-rolled ⁴	3.25 to 3.30	3.25	3.25	3.25- 3.30	3.25	3.25	3.25	3.25			Warren, Ashland = 3.25		3.45		3.95 ^{1,5}	5.85
Cold-rolled ¹	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.70	4.00	Warren 4.00		4.20		Pittsburg, Cal. 4.95	
Galvanized (18 gage)	4.40	4.40	4.40		4.40			4.40	Canton = 4.40	4.40	Ashland = 4.40				5.15 ^{1,5}	
Enameling (12 gage)	4.40	4.40	4.40	4.40			4.40		4.60	4.40			4.70			
Long tee ² (10 gage)	4.80		4.80							4.80						
STRIP Hot-rolled ³	3.25 to 3.30	3.25 to 3.30	3.25	3.25 to 3.30	3.25	3.25	3.25	3.25		3.25	Warren = 3.25		3.45		4.00 to 4.25	5.90
Cold-rolled ⁴	4.00	4.25		4.00		4.00	4.00	4.00			New Haven 4.50 Warren = 4.00 to 4.25		4.20 to 4.50			7.10
TINPLATE Cokes, 1.50 lb. ⁵ base box Electrolytic 0.25, 0.50, 0.75 lb. box	\$7.75	\$7.75	\$7.75		\$7.85			\$7.85	\$7.95		Warren, Ohio = \$7.75				Pittsburg, Cal. = \$8.50	
Deduct \$1.30, \$1.05 and 75¢ respectively from 1.50 lb. coke base box price																
TERNES MFG., special coated	Deduct \$1.10 from 1.50 lb. coke base box price															
BLACKPLATE CANMAKING 55 to 128 lb.	Deduct \$2.00 from 1.50 lb. coke base box price															
BLACKPLATE, h.e., 29 ga. ¹⁰	5.30	5.30	5.30					5.40			Warren, Ohio = 5.30					
BARS Carbon Steel	3.35 to 3.55	3.35	3.35	3.35	3.35	3.35	3.35	3.35		3.35	Canton = 3.35		3.55	3.35	4.05 to 4.10	5.30
Reinforcing (billet) ⁷	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35			Canton = 3.35			3.35	4.05 to 4.10	5.30
Cold-finished ⁸	3.95 to 4.00	4.00	4.00	4.00		4.00	4.00						4.30			
Alloy, hot-rolled	3.75	3.75	3.75			3.75	3.75				Bethlehem, Canton, Massillon = 3.75		4.05	3.75	4.80 ^{1,4}	5.50
Alloy cold-drawn	4.65 to 4.75	4.65	4.65	4.65		4.65	4.65				Massillon = 4.65					
PLATE Carbon steel ¹¹	3.40 to 3.60	3.40	3.40	3.40 to 3.60	3.40 Cons	3.45 hohocken	3.40 = 3.95	3.45 Coatesville = 3.75, Claymont = 3.95 Geneva = 3.40, Harrisburg = 6.50					3.65	3.45	4.30 ^{1,6}	5.80
Floor plates	4.55	4.55		4.55							Cons hohocken = 4.55					
Alloy	4.40	4.40									Coatesville = 5.10					
SHAPES, Structural	3.25 to 3.30	3.25	3.25		3.25	3.30					Bethlehem = 3.30, Geneva, Utah = 3.25			3.30	3.85 to 4.30	5.75
MANUFACTURERS' WIRE ⁹ Bright	4.15 to 4.50	4.15 to 4.65		4.15	4.15		4.15	4.25			Duluth = 4.15, Worcester = 4.45			4.15	5.15 ^{1,3}	
Spring (high carbon)	5.20	5.20		5.20				5.30			Worcester = 5.50 New Haven, Trenton = 5.50			5.20	Duluth = 5.20-6.15	
PILING, Steel sheet	4.05	4.05				4.05										

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	Chromium Nickel						Straight Chromium		
	301	302	303	304	316	347	410	416	430
Ingots, rerolling.....	12.75	13.50	15.00	15.50	22.75	20.00	11.25	13.75	11.50
Slabs, billets, rerolling.....	17.00	18.25	20.25	19.25	30.25	26.75	15.00	18.50	15.25
Forging discs, die blocks, rings.....	30.50	30.50	33.00	32.00	49.00	41.00	24.50	25.00	25.00
Billets, forging.....	24.25- 26.50	24.25- 26.50	26.25- 28.75	25.50- 27.75	39.00- 42.75	32.75- 35.75	19.50- 21.50	20.00- 21.75	20.00- 21.75
Bars, wire, structurals.....	28.50	28.50	31.00	30.00	46.00	38.50	23.00	23.50	23.50
Plates.....	32.00	32.00	34.00	34.00	50.50	44.00	28.00	28.50	28.50
Sheets.....	37.50- 40.75	37.50- 40.75	39.50- 43.00	39.50- 43.00	53.00- 57.25	50.00- 54.00	33.00	33.50	35.50
Strip, hot-rolled.....	24.25	25.75	30.00	27.75	46.00	38.75	21.25	28.00	21.75
Strip, cold-rolled.....	30.50- 30.75	33.00- 33.50	36.50- 39.50	35.00- 35.75	55.00- 57.25	48.50- 50.00	27.00	33.50	27.50

ELECTRODES

Cents per lb. f.o.b. plant, threaded electrodes with nipples, unboxed

Diameter in in.	Length in in.	
Graphite		
17, 18, 20	60, 72	16.00¢
8 to 16	48, 60, 72	16.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
Carbon		
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
17 to 20	84, 90	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

TOOL STEEL

F.o.b. mill					Base
W	Cr	V	Mo	Co	per lb
18	4	1	—	—	90.5¢
18	4	1	—	5	\$1.42
18	4	2	—	—	\$1.025
1.5	4	1.5	8	—	65¢
6	4	2	6	—	69.5¢
High-carbon-chromium.....					52¢
Oil hardened manganese.....					29¢
Special carbon.....					26.5¢
Extra carbon.....					22¢
Regular carbon.....					19¢
Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.					

C-R SPRING STEEL

Base per pound f.o.b. mill	
0.26 to 0.40 carbon.....	4.00¢
0.41 to 0.60 carbon.....	5.50¢
0.61 to 0.80 carbon.....	6.10¢
0.81 to 1.05 carbon.....	8.05¢
1.06 to 1.35 carbon.....	10.35¢
Worcester, add 0.30¢.	

CLAD STEEL

Base prices, cents per pound		
	Plate	Sheet
Stainless clad		
No. 304, 20 pct. f.o.b.		
Coatesville, Pa.	*26.50	
Washington, Pa.	*26.50	*22.50
Claymont, Del.	*26.50	
Conshohocken, Pa.		*22.50
Nickel-clad		
10 pct f.o.b. Coatesville, Pa.		27.50
Inconel-clad		
10 pct. f.o.b. Coatesville.	36.00	
Monel-clad		
10 pct. f.o.b. Coatesville.	29.00	
Aluminized steel sheets		
Hot dip, 20 gage, f.o.b. Butler, Pa.		9.25

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

	Base Column	Pittsburg, Calif.
Standard & coated nails* 103	123	
Galvanized nails*..... 103	123	
Woven wire fence†..... 109	132	
Fence posts, carloadst†... 114		
Single loop bale ties..... 106	130	
Galvanized barbed wire** 123	143	
Twisted barbless wire... 123		

* Pgh., Chi., Duluth; Worcester, 6 columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth only.

	Base per 100 lb	Pittsburg, Calif.
Annealed fence wire†... \$4.80	\$5.75	
Annealed, galv. fencing† 5.25	6.20	
Cut nails, carloadst†... 6.75		

† Add 30¢ at Worcester; 10¢ at Sparrows Pt.
†† Less 20¢ to jobbers.

ELECTRICAL SHEETS

Base, HR cut lengths, f.o.b. mill

	Cents per lb
Armature.....	5.45
Electrical.....	5.95
Motor.....	6.70 to 9.20
Dynamo.....	7.50 to 10.00
Transformer 72.....	8.05 to 11.80
Transformer 65.....	8.60 to 12.35
Transformer 58.....	9.30 to 13.05
Transformer 52.....	10.10

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb.....	\$3.20†
Joint bars, 100 lb.....	4.25
Light rails (from billets) per 100 lb.....	3.55

Base Price
cents per lb

Track spikes.....	5.35
Axles.....	5.20
Screw spikes.....	8.00
Tie plates.....	4.05
Tie plates, Pittsburgh, Calif.*.....	4.20
Track bolts, untreated.....	8.25
Track bolts, heat treated, to railroads.....	8.50
*Seattle, add 30¢.	
†CF&I and Inland, \$3.50.	

HIGH STRENGTH, LOW ALLOY STEELS

Mill base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	Hi Steel	Mayari R	Otiscoloy	Yeloy	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	Great Lakes Steel
Plates.....	5.20	5.20	5.20	5.30	5.20	5.30	5.20	5.40	5.65
Sheets									
Hot-rolled.....	4.95	4.95	4.95	5.25	4.95	4.95	4.95	5.15	5.25
Cold-rolled.....	6.05	6.05	6.05	.....	6.05	6.05	6.05	6.25	6.35
Galvanized.....	.....	6.75	.....	.....	.....	6.75	.....	.....	.....
Strip									
Hot-rolled.....	4.95	4.95	4.95	.....	4.95	4.95	4.95	5.15	5.25
Cold-rolled.....	.....	.....	6.05	.....	.....	6.05	6.05	.....	6.35
Shapes									
.....	.....	4.95	.....	.....	4.95	5.05	4.95	.....	.....
Beams									
.....	.....	4.95	.....	.....	.....	.....	.....	.....	.....
Bars									
Hot-rolled.....	5.10	5.10	5.10	.....	5.10	5.10	5.10	.....	5.40
Bar shapes									
.....	.....	5.10	.....	.....	5.10	5.10	5.10	.....	.....

PIPE AND TUBING

Base discounts, f.o.b. mills,
Base price, \$200.00 per net ton.

STANDARD, THREADED AND COUPLED

Steel, butt weld	Black	Galv.
1/2-in.	43 to 41	20 to 18
3/4-in.	46 to 44	24 to 22
1-in.	48 1/2 to 46 1/2	27 to 25
1 1/4-in.	49 to 47	27 1/2 to 25 1/2
1 1/2-in.	49 1/2 to 47 1/2	28 to 26
2-in.	50 to 48	28 1/2 to 26 1/2
2 1/2 to 3-in.	50 1/2 to 49 1/2	29 to 27

Steel, lap weld		
2-in.	39 1/2	17 1/2
2 1/2 to 3-in.	39 1/2	21 1/2
3 1/2 to 6-in.	46 1/2 to 42	20 1/2 to 24 1/2

Steel, seamless		
2-in.	38 1/2 to 27	16 1/2 to 5
2 1/2 to 3-in.	41 1/2 to 35	19 1/2 to 10 1/2
3 1/2 to 6-in.	43 1/2 to 38 1/2	21 1/2 to 16 1/2

Wrought Iron, butt weld		
1/2-in.	+20 1/2	+52 1/2
3/4-in.	+10 1/2	+41 1/2
1 & 1 1/4-in.	+4 1/2	+32 1/2
2-in.	+1 1/2	+29
3-in.	+2	+28 1/2

Wrought Iron, lap weld		
2-in.	+7 1/2	+36 1/2
2 1/2 to 3 1/2-in.	+5	+32
4-in.	list	+26
4 1/2 to 8-in.	+2	+27 1/2

EXTRA STRONG, PLAIN ENDS

Steel, butt weld		
1/2-in.	42 to 40	20 1/2 to 18 1/2
3/4-in.	46 to 44	24 1/2 to 22 1/2
1-in.	48 to 46	27 1/2 to 25 1/2
1 1/4-in.	48 1/2 to 46 1/2	28 to 26
1 1/2-in.	49 to 47	28 1/2 to 26 1/2
2-in.	49 1/2 to 47 1/2	29 to 27
2 1/2 to 3-in.	50 to 48	29 1/2 to 27 1/2

Steel, lap weld		
2-in.	39 1/2	18 1/2
2 1/2 to 3-in.	44 1/2	23 1/2
3 1/2 to 6-in.	48 to 44	23 to 27

Steel, seamless		
2-in.	37 1/2 to 32 1/2	16 1/2 to 11 1/2
2 1/2 to 3-in.	41 1/2 to 36 1/2	20 1/2 to 15 1/2
3 1/2 to 6-in.	45	24

Wrought Iron, butt weld		
1/2-in.	+16	+46 1/2
3/4-in.	+9 1/2	+39 1/2
1 to 2-in.	+1 1/2	+28 1/2

Wrought Iron, lap weld		
2-in.	+4 1/2	+33
2 1/2 to 4-in.	+5	+21 1/2
4 1/2 to 6-in.	+1	+26

For threads only, butt weld, lap weld and seamless pipe, one point higher discount (lower price) applies. For plain ends, butt weld, lap weld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lap weld and seamless 3 1/2-in. and larger four points higher discount (lower price) applies. On butt weld and lap weld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut length 4 to 24 ft inclusive.

Carbon Steel, all lengths 4 to 24 ft. inclusive.					
OD Gage		Seamless		Electric Weld	
in.	BWG	H.R.	C.R.	H.R.	C.D.
2	13	19.18	22.56	18.60	21.89
2½	12	25.79	30.33	25.02	29.41
3	12	28.68	33.76	27.82	32.74
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78

CAST IRON WATER PIPE

	Per net ton
6 to 24-in., del'd Chicago	\$106.70
6 to 24-in., del'd N. Y.	103.50 to 108.40
6 to 24-in., Birmingham	93.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less	120.30
Class "A" and gas pipe, \$5 extra; 4-in. pipe is \$5 a ton above 6-in.	

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Pct Off List
1/2 in. & smaller x 6 in. & shorter	35
9/16 & 5/8 in. x 6 in. & shorter	37
3/4 in. & larger x 6 in. & shorter	34
All diam, longer than 6 in.	30
Lag, all diam over 6 in. longer	35
Lag, all diam x 6 in. & shorter	37
Plow bolts	47

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

1/2 in. and smaller	35
9/16 to 1 in. inclusive	34
1 1/8 to 1 1/2 in. inclusive	32
1 3/8 in. and larger	27

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifinished Hexagon Nuts

	USS	SAE
7/16 in. and smaller	38	41
1/2 in. and smaller	38	
1/2 in. through 1 in.	37	39
9/16 in. through 1 in.	37	
1 1/8 in. through 1 1/2 in.	35	37
1 3/8 in. and larger	28	

In full case lots, 15 pct additional discount.

Stove Bolts

Packages, nuts separate	\$61.75
In bulk	70.00

Large Rivets

	(1/2 in. and larger)
	Base per 100 lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$6.75
F.o.b. Lebanon, Pa.	6.75

Small Rivets

	(7/16 in. and smaller)
	Pct off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	48

Cap and Set Screws

	(In packages)	Pct Off List
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright		46
3/4 to 1 in. x 6 in., SAE (1035), heat treated		35
Milled studs		19
Flat head cap screws, listed sizes		5
Fillister head cap, listed sizes		28

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill.

	Base price per net ton
Effective CaF ₂ Content:	
70% or more	\$37.00
60% or less	34.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer	\$7.60
Old range, nonbessemer	7.45
Mesabi, bessemer	7.35
Mesabi, nonbessemer	7.20
High phosphorus	7.20
After Dec. 31, 1948, increases or decreases in Upper Lake freight, dock and handling charges and taxes thereon to be for the buyers' account.	

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f.	7.9¢ to 9.0¢
New York, ocean bags	
Domestic sponge iron, 98+%	9.0¢ to 15.0¢
Fe, carload lots	
Electrolytic iron, annealed, 99.5+%	31.5¢ to 39.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+%	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+%	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 microns, 98%, 99.8%+ Fe	90.0¢ to \$1.75
Aluminum	31.00¢
Antimony	51.17¢
Brass, 10 ton lots	27.25 to 37.25¢
Copper, electrolytic	33.625¢
Copper, reduced	34.25¢
Cadmium	\$2.40
Chromium, electrolytic, 99% min.	\$3.50
Lead	28.00¢
Manganese	60.00¢
Molybdenum, 99%	\$2.65
Nickel, unannealed	67.00¢
Nickel, spherical, minus 30 mesh, unannealed	68.00¢
Silicon	34.00¢
Solder powder	8.5¢ plus metal cost
Stainless steel, 302	75.0¢
Tin	\$1.155
Tungsten, 99%	\$2.90
Zinc, 10 ton lots	17.75 to 22.25¢

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	\$15.00 to \$15.50
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	\$16.00 to \$17.50
Foundry, Byproduct	
Buffalo, del'd	\$22.95
Chicago, f.o.b.	20.40
Detroit, f.o.b.	19.40
New England, del'd	23.35
Seaboard, N. J., f.o.b.	21.50
Philadelphia, f.o.b.	21.05
Swedeland, Pa., f.o.b.	21.00
Painesville, Ohio, f.o.b.	20.90
Erie, del'd	\$21.50 to 23.50
Cleveland, del'd	22.45
Cincinnati, del'd	21.50
St. Paul, f.o.b.	23.50
St. Louis, del'd	20.98
Birmingham, del'd	18.66

REFRACTORIES

(F.o.b. Works)

	Carloads, Per 1000
Fire Clay Brick	
First quality, Pa., Md., Ky., Mo., Ill. (except Salina, Pa., add \$5)	\$80.00
No. 1 Ohio	74.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	74.00
No. 2 Ohio	66.00
Ground fire clay, net ton, bulk (except Salina, Pa., add \$1.50)	11.50
Silica Brick	
Mt. Union, Pa., Ensley, Ala.	\$80.00
Childs, Pa.	84.00
Hays, Pa.	85.00
Chicago District	89.00
Western, Utah and Calif.	95.00
Super Duty, Hays, Pa., Athens, Tex.	85.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	\$13.75 to 14.00
Silica cement, net ton, bulk, Hays, Pa.	16.00
Silica cement, net ton, bulk, Ensley, Ala.	15.00
Silica cement, net ton, bulk, Chicago District	14.75
Silica cement, net ton, bulk, Utah and Calif.	21.00
Chrome Brick	
Standard chemically bonded, Balt., Chester	\$69.00
Magnesite Brick	
Standard, Balt. and Chester	\$91.00
Chemically bonded, Balt. and Chester	80.00
Grain Magnesite	
Std. 3/4-in. grains	
Domestic, f.o.b. Balt. and Chester, in bulk, fines removed	\$56.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	\$30.50 to 31.00
in sacks with fines	35.00 to 35.50
Dead Burned Dolomite	
F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk, Midwest, add 10¢; Missouri Valley, add 20¢	\$12.25

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, per 100 lb.
(Metropolitan area delivery, add 15¢ to base, except New York, add 20¢)

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled			Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia	\$5.15-5.71	\$6.31-6.57	\$7.27-7.52	\$5.35-5.66	\$6.51	\$5.37-5.52	\$5.09-5.24	\$5.35-5.57	\$8.16-8.31	\$9.14	\$9.29	\$10.54	\$10.69
New York	5.40-5.98	6.28-6.43	7.25-7.89	5.58-5.88	6.48-6.73	5.78	5.32-5.58	5.53-5.63	6.18-6.38	9.17-9.53	9.32-9.68	10.40-10.77	10.55-10.92
Boston	5.48-5.64	6.39	7.56-7.83	5.54-5.89	6.75-6.79	5.74	5.39-5.54	5.48-5.59	6.24-6.34	9.40-9.44	9.55-9.59	10.84-10.94	10.92-11.09
Baltimore	5.28	6.18	7.15-7.38	5.34		5.53	5.33-5.39	5.39	6.13				
Chicago	4.85-5.10	5.75-5.95	7.10	4.85-5.30	6.52-6.68	5.10	4.90	4.90	5.70	9.35	9.60	10.80	11.05
Milwaukee	5.03	5.93	7.27	5.03	6.80-6.86	5.28	5.08	5.08	5.88	9.38	9.63	10.83	11.08
Norfolk	5.75					6.00	6.00	6.00					
Cleveland	4.98-5.20	5.75 ¹ -6.04 ¹	7.18-7.44	5.02-5.65	6.70	5.35-5.54	5.16-5.42	5.15-5.34	5.70-5.95	9.14-9.66	9.29-9.89	11.05	11.30
Buffalo	4.85	5.75	7.70	5.34	6.35	5.35	5.10	5.05	5.90	9.73	9.98	11.18	11.43
Detroit	5.20-5.55	6.05-6.50	7.70	5.25-5.70	6.25-6.55	5.50-5.55	5.30-5.37	5.30-5.52	6.02-6.07	9.31-9.55	9.20-9.47	10.72-10.95	10.87-11.10
Cincinnati	5.14-5.36 ⁸	5.82-6.21 ⁸	6.97-7.65	5.25-5.62 ⁸	6.31	5.50-5.71 ⁸	5.39-5.47 ⁸	5.30-5.62 ⁸	6.06-6.17 ⁸	9.31-9.35	9.50-9.51	10.75-10.76	10.90-10.91
St. Louis	5.19	6.04-6.09	7.29-7.64	5.19-5.79	6.49	5.50-5.54	5.24	5.24	6.04	9.69	9.94	11.14	11.39
Pittsburgh	4.85-4.90	5.75 ¹	7.15	5.00-5.35	5.95	5.05-5.25	4.90-5.15	4.90-5.10	5.65-5.80	9.35	9.60	10.40	10.55-10.80
St. Paul	5.44	6.34	7.33-7.74	6.44		5.69	5.49	5.49	6.29	9.94	10.13	11.39	11.64
Omaha	5.92		9.18	5.92		6.17	5.97	5.97	6.77				
Birmingham	5.05 ¹		6.45	5.05 ¹¹	6.68	5.25 ¹¹	6.00 ¹¹	5.00 ¹¹	6.66				
Houston	6.40		8.80	6.75		6.35	6.20	6.40	7.60	9.80	9.65	10.75	10.95
Los Angeles	6.30-6.40	7.85 ¹ -7.90	7.95-8.90	6.60-6.66	9.35 ⁵	6.10-7.40	5.75-5.90	6.05	7.85 ¹⁵ -8.45	10.90	10.85	12.40	12.65
San Francisco	5.95 ⁸	7.15 ²	8.25-8.90	6.75 ⁸ -8.90	8.25	6.30-7.60	5.90-6.90	5.90	7.55	10.90		10.85	12.40
Portland	6.50 ⁴	8.00 ²	8.15 ² -8.45 ²	6.85 ⁴		6.30 ⁴	6.25 ⁴	6.25 ⁴	8.25 ⁴		10.45 ¹⁵		12.05 ¹⁵
Seattle	6.20 ⁴ -6.30 ⁴	7.75 ² -7.85 ²	7.65-8.00	6.55 ⁴ -6.85 ⁴		6.20-6.30	6.15-6.25	6.05 ⁴ -6.15 ⁴	8.00 ¹⁴ -8.10 ¹⁴		10.30 ¹⁵ -10.40 ¹⁵		12.00 ¹⁵ -12.05 ¹⁵
Salt Lake City	7.05-8.00	8.20	7.90-9.06	7.10-7.59		5.75-6.65	6.85-7.00	6.95-7.25	7.55-8.40				

BASE QUANTITIES

Standard unless otherwise keyed on prices.

COLD-ROLLED:

Sheets, 400 to 1999 lb; strip, extras on all quantities bars 1000 lb and over.

ALLOY BARS:

1000 to 1999 lb.

GALVANIZED SHEETS:

450 to 1499 lb.

EXCEPTIONS:

(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb.

HOT-ROLLED:

Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight nor the 6 pct increase on total freight charges in the Eastern Zone (5 pct Southern Zone, 4 pct Western Zone), effective Jan. 11, 1949.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00				
Birmingham	42.88	43.38			
Buffalo	47.00	47.00	47.50		
Chicago	46.00	46.00	46.50	47.00	
Cleveland	46.00	46.50	46.50	47.00	51.00
Duluth	46.00	46.50	46.50	47.00	
Erie	46.00	46.50	46.50	47.00	
Everett	47.90	52.75	53.25		
Granite City	47.90	48.40	48.90		
Ironton, Utah	45.00-55.00	46.50-55.50			
Lone Star, Texas		75.00 [†]			
Neville Island	46.00	46.50	46.50		
Geneva, Utah	46.00	46.50			
Sharpsville	46.00	46.50	46.50	47.00	
Steeltown	46.00	48.50	49.00	49.50	54.00
Struthers, Ohio	46.00				
Swedeland	50.00	50.50	51.00	51.50	
Toledo	46.00	46.50	46.50	47.00	
Troy, N. Y.					54.00
Youngstown	46.00	46.50	46.50		

DELIVERED PRICES (BASE GRADES)

Consuming Point	Producing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	\$0.50 Arb.		52.75	53.25		
Boston	Steeltown	6.27	54.27	54.77	55.27	55.77	60.27
Brooklyn	Bethlehem	3.90	51.90				
Cincinnati	Birmingham	6.09	48.97	49.46			
Jersey City	Bethlehem	2.39	50.39				
Los Angeles	Geneva-Ironton	6.93	52.93-61.93	53.43-62.43			
Mansfield	Cleveland-Toledo	3.03	49.03-48.53	49.53-49.03	49.53	50.03	54.03
Philadelphia	Bethlehem	2.21	50.21				
Philadelphia	Swedeland	1.31	51.31	51.81	52.31	52.81	
Philadelphia	Steeltown	2.81	50.81	51.31	51.81	52.31	56.81
San Francisco	Geneva-Ironton	6.93	52.93-61.93	53.43-62.43			
Seattle	Geneva-Ironton	6.93	52.93-61.93	53.43-62.43			
St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65		

† Low Phos, Southern Grade.

Producing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00

pct. \$2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and \$1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio —\$59.50; f.o.b. Buffalo, \$60.75. Add \$125 per ton for each additional 0.50 pct Si up to 12 pct. Add 50¢ per ton for each 0.50 pct

Mn over 1.60 pct. Add \$1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are \$1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus \$66.00 per gross ton, f.o.b. Lyles, Tenn. Delivered Chicago, \$73.78. High phosphorus charcoal pig iron is not being produced.

Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size.	
F.o.b. Birmingham	\$162
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont.	\$160
F.o.b. Johnstown, Pa.	\$162
F.o.b. Sheridan, Pa.	\$160
F.o.b. Etna, Pa.	\$163
\$2.00 for each 1% above 82% Mn; penalty, \$2.00 for each 1% below 78%.	
Briquets—Cents per pound of briquet, delivered, 66% contained Mn.	10.0
Carload, bulk	11.6
Ton lots	12.5
Less ton lots	

Spiegeleisen

Contract prices gross ton, lump, f.o.b.	
16-19% Mn	19-21% Mn
3% max. Si	3% max. Si
Palmerton, Pa.	\$61.00
Pgh. or Chicago	\$65.00
	\$62.00
	\$65.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.	
96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.	
Carload, packed	35.5
Ton lots	37.0

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.	
Carloads	28
Ton lots	30
Less ton lots	32

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.	
Carloads Ton Less	
0.07% max. C, 0.06% P, 90% Mn	25.25 27.10 28.30
0.10% max. C	24.75 26.60 27.80
0.15% max. C	24.25 26.10 27.30
0.30% max. C	23.75 25.60 26.80
0.50% max. C	23.25 25.10 26.30
0.75% max. C	
7.00% max. Cl	20.25 22.10 23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C.	
Carload bulk	8.60
Ton lots	10.25
Briquet, contract basis, carlots, bulk delivered, per lb of briquet	10.0
Ton lots	11.6
Less ton lots	12.5

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, openhearth \$84.00, foundry, \$85.00; \$84.75 f.o.b. Niagara Falls; Electric furnace silvery iron is not being produced at Jackson. Add \$1.00 per ton for each additional 0.50% Si up to and including 18%. Add \$1.00 for each 0.50 pct. Mn over 1 pct.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.	
96% Si, 2% Fe	20.70
97% Si, 1% Fe	21.10

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.	
Carload, bulk	6.30
Ton lots	7.90
Less ton lots	8.80

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size, bulk, in carloads, delivered.	
25% Si	18.50
50% Si	11.30
75% Si	13.50
85% Si	14.65
90-95% Si	16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.	
Cast Turnings Distilled	
Ton lots	\$2.05 \$2.95 \$3.75
Less ton lots	2.40 3.30 4.55

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered.	
(65-72% Cr, 2% max. Si)	
0.06% C	28.75
0.10% C	28.25
0.15% C	28.00
0.20% C	27.75
0.50% C	27.50
1.00% C	27.25
2.00% C	27.00
65-69% Cr, 4-9% C	20.50
62-66% Cr, 4-6% C, 6-9% Si	21.35
Briquets—Contract price, cents per pound of briquet, delivered, 60% chromium.	
Carload, bulk	13.75
Ton lots	15.25
Less ton lots	16.15

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.	
High carbon type: 60.65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.	
Carloads	21.60
Ton lots	23.75
Less ton lots	25.25
Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.	
Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

Chromium Metal

Contract prices, cents per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.	
0.20% max. C	1.09
0.50% max. C	1.05
9.00% min. C	1.04

Calcium—Silicon

Contract price per lb of alloy, lump, delivered.	
30-33% Ca, 60.65% Si, 3.00% max. Fe.	
Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.	
16-20% Ca, 14-18% Mn, 53-59% Si.	
Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CMSZ

Contract price, cents per pound of alloy, delivered.	
Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.	
Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.	
Ton lots	19.75
Less ton lots	21.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.	
Ton lots	15.75¢
Less ton lots	17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. SI 48 to 52%, TI 9 to 11%, Ca 5 to 7%.	
Ton lots and carload packed	18.00¢
Less ton lots	19.50¢

SMZ

Contract price, cents per pound of alloy, delivered. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.	
Ton lots	17.25
Less ton lots	18.50

Other Ferroalloys

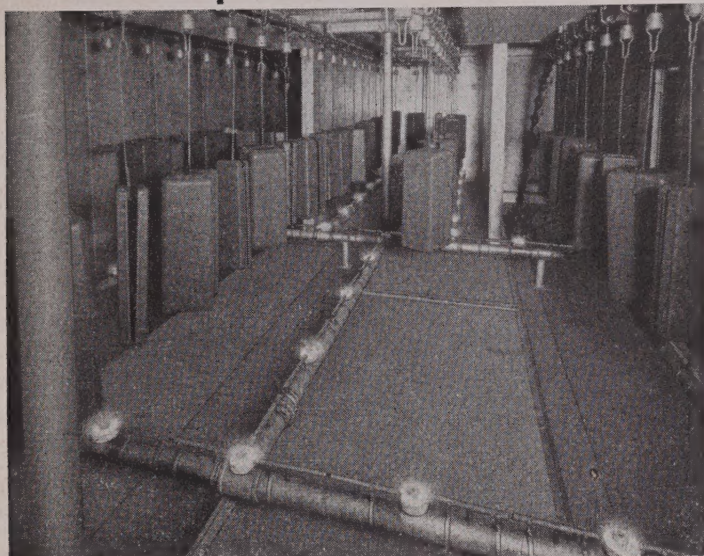
Ferrotungsten, standard, lump or ½ x down, packed, per pound contained W, 5 ton lots, delivered	\$2.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained, V.	
Openhearth	\$2.90
Crucible	3.00
High speed steel (Primos)	3.10
Vanadium pentoxide, 88-92% V ₂ O ₅ contract basis, per pound contained V ₂ O ₅	\$1.20
Ferrocolumbium, 50-60% contract basis, delivered, per pound contained Cb.	
Ton lots	\$2.90
Less ton lots	2.95
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo.	\$1.10
Calcium molybdate, 45-50%, f.o.b. Langeloth, Pa., per pound contained Mo.	96¢
Molybdenum oxide briquets, f.o.b. Langeloth, Pa., per pound contained Mo.	95¢
Ferrotitanium, 40%, regular grade, 10% C max., f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	\$1.28
Ferrotitanium, 25%, low carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	\$1.40
Less ton lots	1.45
Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, carloads, per net ton	\$160.00
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$3 unitage, per gross ton	\$65.00
10 tons to less carload	75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per pound of alloy.	
Carload, bulk	6.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	8.90¢
Ton lots	9.80¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk	11.00¢
Ton lots, packed	11.25¢
Less ton lots	11.75¢
Boron Agents	
Contract prices per pound of alloy, delivered.	
Ferroboreon, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D.	
Ton lot	\$1.20
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.	
Ton lots	\$1.67
Less ton lots	1.79
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	\$1.80
Silcaz, contract basis, delivered.	
Ton lots	45.00¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	93¢
No. 6	63¢
No. 79	45¢
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b. Suspension Bridge, N. Y.; freight allowed, TI 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.	
Ton lots, per pound	8.625¢
Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	\$6.25

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